MATH YOU NEED

Book 2

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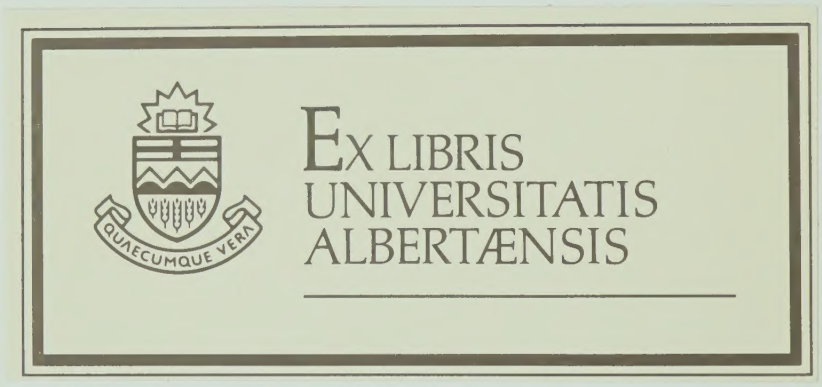
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Book 2

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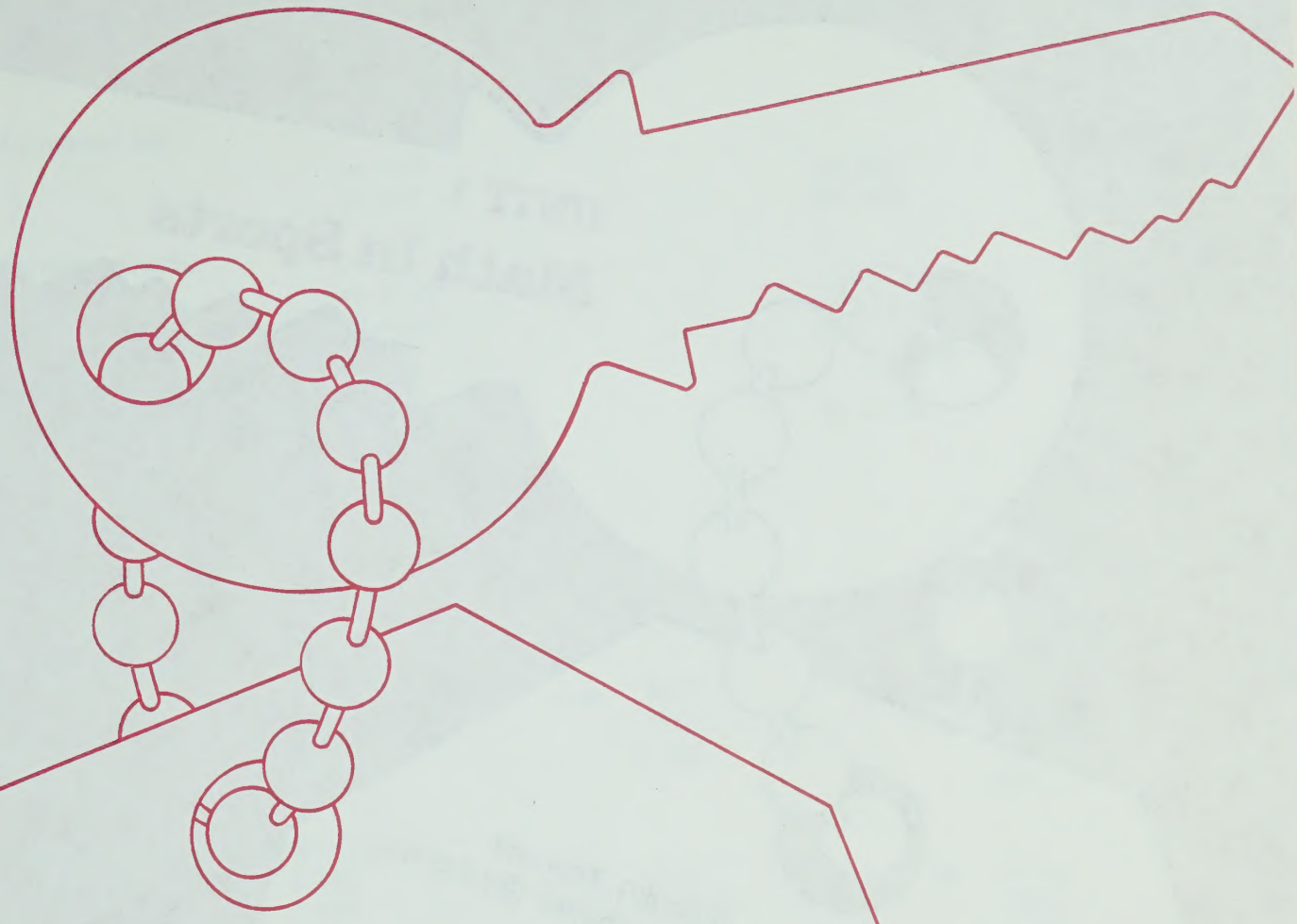

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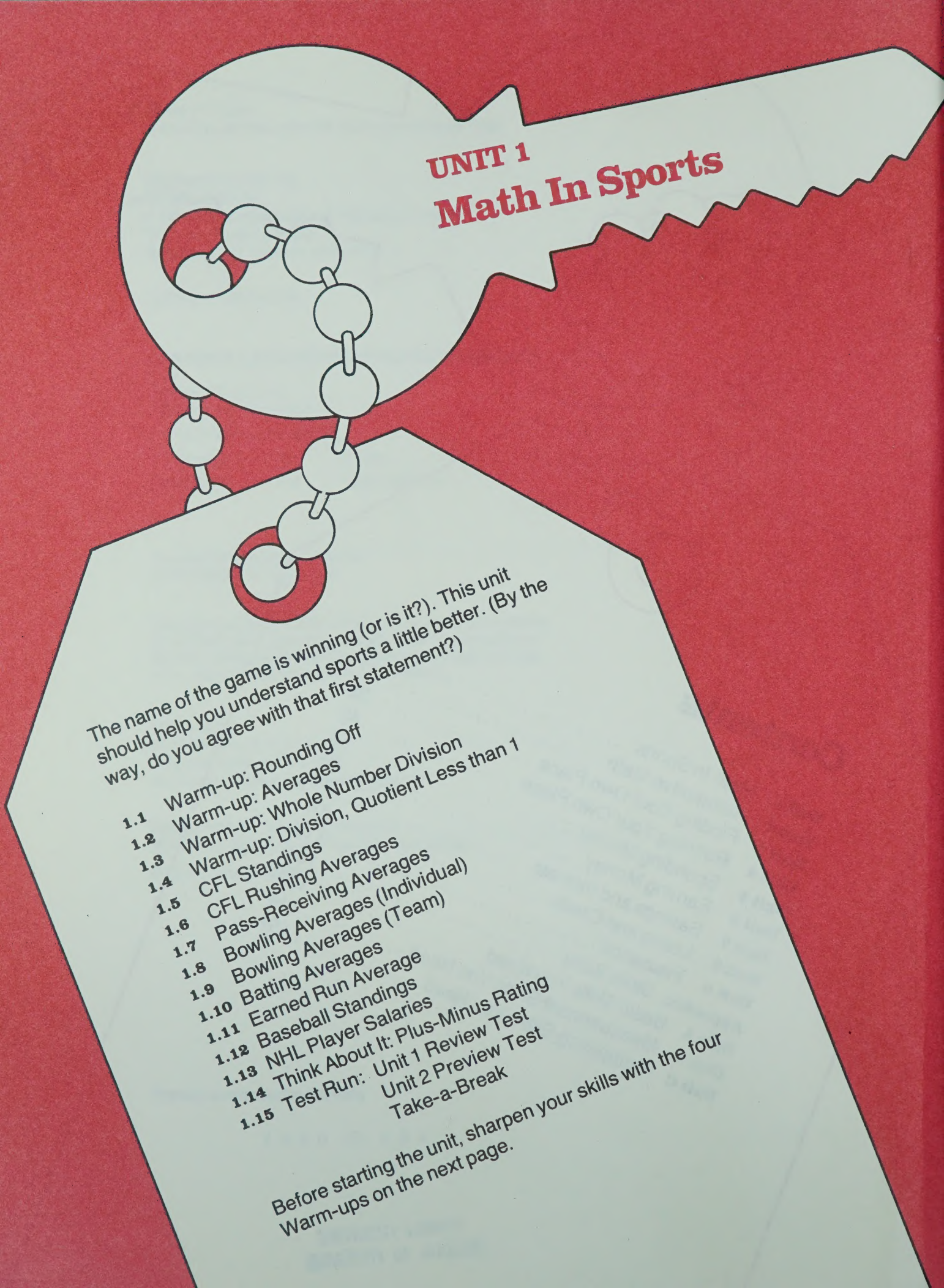


UNIT 1
Math In Sports

The name of the game is winning (or is it?). This unit should help you understand sports a little better. (By the way, do you agree with that first statement?)

1.1 Warm-up: Rounding Off
1.2 Warm-up: Averages
1.3 Warm-up: Whole Number Division
1.4 Warm-up: Division, Quotient Less than 1
1.5 CFL Standings
1.6 CFL Rushing Averages
1.7 Pass-Receiving Averages
1.8 Bowling Averages (Individual)
1.9 Bowling Averages (Team)
1.10 Batting Averages
1.11 Earned Run Average
1.12 Baseball Standings
1.13 NHL Player Salaries
1.14 Think About It: Plus-Minus Rating
1.15 Test Run: Unit 1 Review Test
Unit 2 Preview Test
Take-a-Break

Before starting the unit, sharpen your skills with the four Warm-ups on the next page.

1.1 Warm-up: Rounding Off

1. Round to the nearest ten.
   (a) 68
   (b) 72
   (c) 115
   (d) 627
   (e) 381
   (f) 429

2. Round to the nearest tenth.
   (a) 0.12
   (b) 0.39
   (c) 0.145
   (d) 0.257
   (e) 0.164
   (f) 0.379

3. Round to the nearest hundredth.
   (a) 6.176
   (b) 2.029
   (c) 3.144

1.2 Warm-up: Averages

1. Find the averages of these.

   (a)
   $$\begin{array}{r} 64 \\ 29 \\ +\ 38 \\ \hline \end{array}$$

   (b)
   $$\begin{array}{r} 217 \\ 72 \\ +\ 843 \\ \hline \end{array}$$

   (c)
   $$\begin{array}{r} 6132 \\ 9107 \\ +\ 708 \\ \hline \end{array}$$

   (d)
   $$\begin{array}{r} 21 \\ 42 \\ 57 \\ +\ 64 \\ \hline \end{array}$$

2. Find the averages of these (to 2 decimal places).

   (a)
   $$\begin{array}{r} 6.41 \\ 9.018 \\ +\ 3.12 \\ \hline \end{array}$$

   (b)
   $$\begin{array}{r} 0.145 \\ 1.087 \\ +\ 0.76 \\ \hline \end{array}$$

   (c)
   $$\begin{array}{r} 21.4 \\ 1.917 \\ +\ 2.16 \\ \hline \end{array}$$

   (d)
   $$\begin{array}{r} 0.008 \\ 0.012 \\ +\ 0.137 \\ \hline \end{array}$$

1.3 Warm-up: Whole Number Division

1. Divide.
   (a) $160 \div 8 =$
   (b) $250 \div 5 =$
   (c) $140 \div 7 =$
   (d) $366 \div 6 =$
   (e) $819 \div 9 =$
   (f) $726 \div 6 =$
   (g) $840 \div 12 =$
   (h) $290 \div 10 =$
   (i) $121 \div 11 =$

2. Divide.
   (a) $367 \div 14 =$
   (b) $784 \div 23 =$
   (c) $926 \div 43 =$
   (d) $1876 \div 103 =$
   (e) $6178 \div 689 =$
   (f) $123\,679 \div 1792 =$

1.4 Warm-up: Division, Quotient Less than 1

1. Divide.
   (a) $64 \div 80 =$
   (b) $81 \div 90 =$
   (c) $16 \div 40 =$
   (d) $63 \div 90 =$
   (e) $125 \div 2500 =$
   (f) $840 \div 8000 =$

2. Divide. Round to 2 decimal places where necessary.
   (a) $5 \div 10 =$
   (b) $2 \div 4 =$
   (c) $79 \div 395 =$
   (d) $24 \div 192 =$
   (e) $607 \div 791 =$
   (f) $19 \div 29 =$

1.5 CFL Standings

Game results are recorded in team standings. For example, Hamilton Tiger Cats had a record of 8 wins, 7 losses, and 1 tie. How many points did they have? (A win = 2 points; a tie = 1 point.)

TOTAL POINTS = (NUMBER OF WINS × 2) + NUMBER OF TIES

Hamilton's total points = (8 wins × 2 points) + 1
= 16 points + 1
= 17 points

1. Find the total points for each team.

	EASTERN CONFERENCE				
	Team	**Win**	**Loss**	**Tie**	**Total Points**
(a)	Ottawa	10	6	0	20 + 0 = 20
(b)	Hamilton	8	6	2	
(c)	Toronto	7	8	1	
(d)	Montreal	5	10	1	

	WESTERN CONFERENCE				
	Team	**Win**	**Loss**	**Tie**	**Total Points**
(e)	Winnipeg	11	5	0	
(f)	Regina	9	7	0	
(g)	B.C.	7	8	1	
(h)	Edmonton	6	8	2	
(i)	Calgary	4	11	1	

2. Find the total points for each team.

	EASTERN CONFERENCE				
	Team	**Win**	**Loss**	**Tie**	**Total Points**
(a)	Montreal	6	7	3	
(b)	Hamilton	9	4	3	
(c)	Toronto	8	4	4	
(d)	Ottawa	10	4	2	

	WESTERN CONFERENCE				
	Team	**Win**	**Loss**	**Tie**	**Total Points**
(e)	Calgary	4	3	9	
(f)	B.C.	8	4	4	
(g)	Winnipeg	7	3	6	
(h)	Edmonton	11	3	2	
(i)	Regina	14	2	0	

(j) Which team had the most points in the Eastern Conference?
(k) Which team had the most points in the Western Conference?

3. Find the total points for each team.

	CFL STANDINGS, EAST AND WEST				
	Team	**Win**	**Loss**	**Tie**	**Total Points**
(a)	Edmonton	11	2	3	
(b)	Ottawa	12	4	0	
(c)	Montreal	9	5	2	
(d)	Calgary	7	4	5	
(e)	Hamilton	10	3	3	
(f)	B.C.	8	8	0	
(g)	Toronto	9	7	0	
(h)	Regina	10	5	1	
(i)	Winnipeg	6	7	3	

(j) Rank the teams from first to last according to points.

Math YOU Need

4. Which teams, in question 3, could lose fans? Give a reason for your answer.

1.6 CFL Rushing Averages

A very important statistic in football is the rushing average. For example, Jimmy Edwards once rushed for 1200 yards in 200 carries. What was his rushing average?

RUSHING AVERAGE = TOTAL YARDS ÷ TOTAL CARRIES

Edward's rushing average = 1200 yards ÷ 200 carries
= 6 yards

1. Find the rushing averages for these players.

	Player	Total Yards	Carries	Average
(a)	Cleary	192	32	192 ÷ 32 = 6 yards
(b)	Smith	329	47	
(c)	Holmes	348	58	
(d)	Jones	608	76	
(e)	Bell	889	127	
(f)	Thompson	672	168	
(g)	Harris	1600	200	
(h)	Eley	655	131	
(i)	Lumsden	918	102	
(j)	Metcalf	1530	170	

2. Round off these rushing averages to the nearest tenth.

(a) 7.67 = 7.7 yards
(b) 9.35 =
(c) 10.14 =
(d) 8.79 =
(e) 5.46 =
(f) 12.417 =
(g) 15.723 =
(h) 16.791 =
(i) 12.376 =
(j) 8.841 =
(k) 9.716 =
(l) 10.943 =
(m) 11.851 =
(n) 12.984 =
(o) 14.976 =

3. Calculate these players' rushing averages (to the nearest tenth).

	Player	Total Yards	Carries	Average
(a)	Ace	271	38	271 ÷ 38 = 7.1 yards
(b)	Hal	306	81	
(c)	Bailey	637	127	
(d)	Hogan	803	102	
(e)	Gere	805	168	

4. Calculate these players' rushing averages.

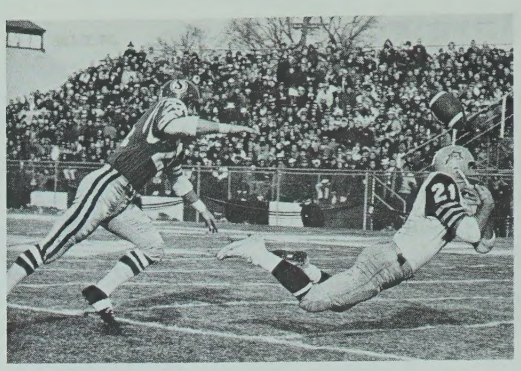
	Player	Team	Year	Total Yards	Carries	Average
(a)	Willie Burden	Calgary	1975	1896	332	
(b)	Earl Lunsford	Calgary	1961	1794	296	
(c)	George Reed	Saskatchewan	1965	1768	274	
(d)	Johnny Bright	Edmonton	1958	1722	296	
(e)	Lovell Coleman	Calgary	1964	1629	260	
(f)	Jimmy Edwards	Hamilton	1977	1581	250	
(g)	Mack Herron	Winnipeg	1972	1527	258	
(h)	George Dixon	Montreal	1962	1520	216	

*NOTE: Canadian Football League statistics are currently calculated in *yards*. A metre is approximately 39.5 inches, slightly longer than a yard.

Math YOU Need

5. Which 6 players, from question 1, would you put on an all-star team?

1.7 Pass-Receiving Averages



A quarterback will try to "hit" a good receiver when he throws the ball. For example, Tony Gabriel gained 700 yards in 56 receptions in one season. What was his pass-receiving average?

PASS-RECEIVING AVERAGE = YARDS ÷ RECEPTIONS

Gabriel's pass-receiving average = 700 yards ÷ 56 receptions
= 12.5 yards

$$
\begin{array}{r}
12.5 \\
56\overline{)700.00} \\
\underline{56} \\
140 \\
\underline{112} \\
280 \\
\underline{280} \\
0
\end{array}
$$

Add decimal and zero if necessary

1. Find the pass-receiving averages for these players (round to the nearest tenth if necessary).

	Player	Yards	Receptions	Average
(a)	Rodgers	196	28	7 yards
(b)	Hopkins	288	24	
(c)	Nixon	884	68	
(d)	Harvey	594	54	
(e)	Dalla Riva	300	25	

	Player	Yards	Receptions	Average
(f)	McGowan	630	30	
(g)	Forzani	657	54	
(h)	Literman	575	48	
(i)	Campana	705	45	
(j)	Thompson	391	35	

2. Some of the averages in this chart are wrong. Check the calculations. Write the correct average for each player in your notebook.

	Player	Yards	Receptions	Average
(a)	Jones	630	35	18 yds.
(b)	Ahou	633	29	21.8 yds.
(c)	Peters	517	37	14.7 yds.
(d)	Wiley	282	24	11.8 yds.
(e)	Longman	970	68	12.3 yds.
(f)	Brinks	418	72	5.8 yds.
(g)	Boulder	637	97	7.8 yds.
(h)	Forsh	556	48	11.5 yds.

3. Calculate the pass-receiving averages for these players.

	Career Pass-Receiving Averages (to 1980)			
	Player	Yards	Receptions	Average
(a)	Tommy-Joe Coffey	10 320	650	
(b)	Terry Evanshen	9697	600	
(c)	Hal Patterson	9473	460	
(d)	Jim Young	9114	517	
(e)	Bob Taylor	8223	521	
(f)	Garney Henley	4657	243	

(g) Who has the best average?

*NOTE: Canadian Football League statistics are currently calculated in *yards*. A metre is approximately 39.5 inches, slightly longer than a yard.

Math YOU Need

4. Which player in question 3 would you sign to a multi-year contract?

1.8 Bowling Averages (Individual)

Bowlers rate themselves with bowling averages. For example, Jack bowled a total of 1023 points in 9 games. What was his bowling average?

BOWLING AVERAGE = TOTAL POINTS ÷ NUMBER OF GAMES

Jack's scores for 9 games:

	109
	95
	114
	131
	125
	120
	112
	98
	119
TOTAL =	1023

1023 ÷ 9
= 113 ← Jack's bowling average

```
      113
9)1023
   9XX
    12
     9
     33
     27
      6
```

Don't worry about the remainder. It's not counted in the average.

1. Estimate then calculate these players' totals and averages.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Janet	**Bob**	**Ryan**	**Helen**	**Gerry**	**Margo**	**Fred**
Game 1	143	136	135	126	211	179	221
Game 2	96	113	145	149	181	195	230
Game 3	134	134	143	148	178	201	198
Game 4	115	136	126	157	165	185	179
Game 5	113	145	136	161	221	196	164
Game 6	122	133	152	123	157	204	185
Game 7	111	134	131	149	163	203	187
Game 8	124	154	117	116	200	178	199
Game 9	121	152	115	92	201	181	201
Estimate Total	Approx. 1000 ← 9 games × about 110 = about 1000						
Estimate Average	Approx. 110 ← 1000 ÷ 9 = about 110						
Actual Total	1079						
Actual Average	1079 ÷ 9 = 119						

2. Who's the best after one match (3 games)? Estimate who you think will be the best bowler. Then, calculate the totals and averages to see if you were right.

	(a)	(b)	(c)	(d)	(e)
Match 1	**Boris**	**Ying**	**John**	**Alma**	**Sam**
Game 1	171	157	166	121	177
Game 2	164	193	104	145	196
Game 3	186	171	117	156	124
Total					
Average					

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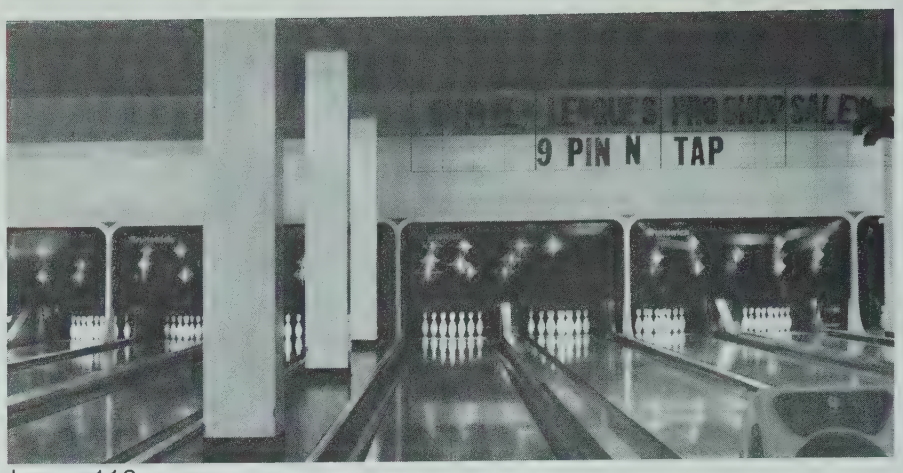
3. Boris, in question 2, improved his scores by 10%. What is his new average?

1.9 Bowling Averages (Team)



Team bowling averages are found by adding up the averages of all the team members. For example, the Hubcaps had the following individual averages:

John	117
Lucy	121
Ethel	119
Harry	116
Ricky	124
Total =	597 pins

The Hubcaps' team average = 597 pins ÷ 5 bowlers = 119

1. Find the team averages for these teams.

(a) Cards	(b) Demons	(c) Cools	(d) Sharks	(e) Highs	(f) Lows
114	162	106	122	147	121
127	143	112	127	142	117
133	132	115	108	130	119
154	118	123	114	134	139
107	121	128	118	137	141
635					

2. Find these team averages.

(a) Blocks	(b) Bulls	(c) Hawks	(d) Doves	(e) Bolts	(f) Rugs	(g) Shags
117	141	170	133	184	193	122
164	155	164	123	174	136	138
119	119	116	129	155	147	161
121	123	155	117	154	181	117
135	124	120	161	176	136	115

3. Calculate the Boar's team average after 9 games.

	(a) Red	(b) Gilda	(c) Bruce	(d) Frieda	(e) Al
Game 1	117	142	165	144	136
Game 2	164	152	161	123	121
Game 3	118	178	173	118	122
Game 4	144	201	143	177	133
Game 5	132	189	206	164	119
Game 6	156	164	210	191	127
Game 7	151	171	147	146	118
Game 8	145	182	191	145	164
Game 9	131	119	189	114	171
Individual Total					
Individual Average					

(f) Team average after 9 games = ___?___

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4. Which player in question 3 might the captain want to replace?

1.10 Batting Averages

Trying to hit a baseball is one of the hardest parts of the game. Players spend much time working on their batting averages. For example, Doug Ault of the Toronto Blue Jays had 28 hits in 144 times at bat in one season. What was his batting average?

BATTING AVERAGE = HITS ÷ TIMES AT BAT

Ault's batting average = 28 hits ÷ 144 times at bat
= 0.194

$$144\overline{)28.0000} = 0.194$$

14 4 xx
13 60
12 96
640
576
64

Batting averages are written as 3-digit decimals.

1. Find the batting averages for these Montreal Expos players.

	Player	Hits	Times at Bat	Average
(a)	Valentine	98	311	
(b)	Dawson	178	577	
(c)	Macha	31	107	
(d)	Cromartie	172	597	

	Player	Hits	Times at Bat	Average
(e)	Montanez	136	500	
(f)	Office	78	292	
(g)	Speier	103	388	
(h)	Carter	145	549	

(i) Who had the best average?

2. Find the batting averages for these Toronto Blue Jays players.

	Player	Hits	Times at Bat	Average
(a)	Woods	112	373	
(b)	Garcia	151	543	
(c)	Howell	142	528	
(d)	Velez	96	357	

	Player	Hits	Times at Bat	Average
(e)	Bonnell	124	463	
(f)	Griffin	166	653	
(g)	Mayberry	124	501	
(h)	Lorg	55	222	

(i) Who needs to work more at batting?

3. Calculate these team batting averages.

	Team	Hits	Times at Bat	Average
(a)	Royals	1633	5714	
(b)	Rangers	1616	5690	
(c)	Red Sox	1588	5603	
(d)	Indians	1517	5470	
(e)	Braves	1555	5653	
(f)	Blue Jays	1398	5571	

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4. If Mayberry improved his batting average by 20%, would he be rated higher than Garcia? Use the information in question 2.

1.11 Earned Run Average

In baseball there are 9 innings in a game. Pitchers are rated by their earned run averages (ERA). For example Jerry Garvin of the Toronto Blue Jays pitched 245 innings one season. He gave up 114 earned runs.

What was his earned run average?

EARNED RUN AVERAGE = (EARNED RUNS ÷ INNINGS PITCHED) × 9

Garvin's ERA = (114 earned runs ÷ 245 innings pitched) × 9

= 0.465 × 9

= 4.19 ← ERA'S are given to the nearest hundredth.

1. Calculated the ERA's for these pitchers.

	Pitcher	Earned Runs	Innings Pitched	ERA
(a)	Tanana	68	241	
(b)	Blyleven	71	235	
(c)	Ryan	92	299	
(d)	Guidry	66	211	
(e)	Palmer	103	319	
(f)	Leonard	99	293	
(g)	Rozema	75	218	
(h)	Candelaria	60	231	
(i)	Seaver	75	261	
(j)	Hooton	65	223	

(k) Rate the pitchers from first (lowest ERA) to last (highest ERA).

2. Calculate the ERA's for these Toronto Blue Jays pitchers.

	Pitcher	Earned Runs	Innings Pitched	ERA
(a)	Clancy	64	118	
(b)	Jefferson	104	217	
(c)	Lemanczyk	119	252	
(d)	Murphy	23	31	
(e)	Underwood	19	33	

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3. Carl had an ERA of 7.28. Why was he dropped from the team?

1.12 Baseball Standings

Baseball standings are called percentages. Two facts are used to calculate the percentage: Games won and games played.
For example, the Toronto Blue Jays had won 8 games after playing 14 games one season. What was their percentage?

PERCENTAGE = NUMBER OF WINS ÷ NUMBER OF GAMES PLAYED

Blue Jays' percentage = 8 wins ÷ 14 games played
= 0.57142
= 0.571

Percentage is rounded to a 3-digit decimal.

1. Round off these team percentages to 3-digit decimals.

	Team	Percentage
(a)	Tigers	0.416789 = 0.417
(b)	Braves	0.321614
(c)	Indians	0.645716
(d)	Orioles	0.323654
(e)	Yankees	0.548514
(f)	Red Sox	0.415643
(g)	Blue Jays	0.648719
(h)	Chiefs	0.432644

2. Find the percentages for these National League teams.

	Team	Won	Lost	Games Played	Percentage
(a)	Mets	25	20	25 + 20 = 45	25 ÷ 45 = 0.556
(b)	Cardinals	23	22		
(c)	White Sox	21	24		
(d)	Phillies	19	26		
(e)	Pirates	17	28		
(f)	Expos	13	32		

3. Find the percentages for these American League teams.

	Team	Won	Lost	Games Played	Percentage
(a)	Mariners	59	103		
(b)	Athletics	83	79		
(c)	Royals	97	65		
(d)	Rangers	76	85		
(e)	White Sox	70	90		

(f) List the teams in their proper standings from first (highest percentage) to last (lowest percentage).

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4. How many more games would the Mariners have to win to move into first place? Use the information in question 3.

1.13 NHL Player Salaries

Newspapers tell us how much hockey players earn in a contract. But, have you ever wondered how much a player earns in a game?

For example, Guy Lafleur of the Montreal Canadiens was paid $180 000 for the 1978-1979 season.

How much was he paid per game?

AMOUNT PAID PER GAME = YEARLY SALARY ÷ GAMES IN SEASON

Lafleur's amount paid per game = $180 000 ÷ 80 games

= $2250.00

1. Complete this 1978-1979 salary sheet for these Montreal Canadiens' players. (NOTE: NHL season is 80 games long.)

	Player	Yearly Salary	Amount Per Game
(a)	Engblom	$55 000	
(b)	Bouchard	$80 000	
(c)	Lambert	$85 000	
(d)	Larouche	$100 000	
(e)	Laroque	$105 000	
(f)	Shutt	$120 000	
(g)	Robinson	$125 000	
(h)	Lemaire	$135 000	
(i)	Savard	$155 000	
(j)	Cournoyer	$160 000	
(k)	Lapointe	$175 000	
(l)	Dryden	$180 000	
(m)	TOTAL YEARLY SALARY =		TOTAL PER GAME =

2. Here is a possible all-star team. Estimate then calculate the amount each player would earn per game, based on a 75-game season.

	Player	Yearly Salary	Estimate, Per Game	Actual, Per Game
(a)	Lysiak	$130 000		
(b)	Clarke	$160 000		
(c)	Dionne	$320 000		
(d)	Park	$250 000		
(e)	Martin	$170 000		
(f)	Potvin	$150 000		
(g)	Salming	$155 000		
(h)	Resch	$100 000		
(i)	Esposito	$325 000		
(j)	Lafleur	$180 000		
(k)	TOTAL YEARLY SALARY =			TOTAL PER GAME =

3. (a) In question 2, who are the 3 highest paid players?
   (b) What does each of these players earn per period in a game? (There are 3 periods per game.)
   (c) What does each of these players earn per minute in a game? (There are 60 min in a game.)

Math YOU Need

4. True or false: A hockey player's salary is a reflection of his talents. Give a reason for your answer.

1.14 Think About It: Plus-Minus Rating

On this page, you will try to discover just how good some hockey players are at playing hockey.
A plus-minus system is used to rate a player's effectiveness. The bigger the plus (+) rating, the better the player.
To find a player's plus-minus rating, take the difference between the goals scored for and against while the player is on the ice.
For example, a player is on the ice when his team scores 85 goals (over many games). He is also on the ice when his team has 82 goals scored against it. What is his plus-minus rating?

PLUS-MINUS RATING = GOALS FOR − GOALS AGAINST
= 85 goals for − 82 goals against
= + 3 3 more goals were scored *for* his team than *against* his team; he has a *plus 3* (+3) rating.

1. Find the plus-minus ratings for these players.

	Player	Goals For	Goals Against	Rating
(a)	Harper	71	94	71 − 94 = −23
(b)	Lysiak	57	56	
(c)	Plett	64	61	
(d)	Libett	54	49	
(e)	Clarke	65	51	
(f)	MacLeish	52	45	
(g)	Saleski	41	41	
(h)	Park	72	61	
(i)	Martin	68	54	
(j)	Lafleur	82	64	
(k)	Sittler	75	63	
(l)	Hampton	62	73	

(m) Who according to the rating is the most effective player? Do you agree? Give a reason for your answer.

2. If a player is on a "power-play", will this help his rating?

3. If a player is a "penalty-killer", will this help his rating?

4. If a player is on a last-place team, will his rating probably be good or poor? Give a reason for your answer.

5. A player scored 40 goals one season, but had a rating of −26. Would you trade him?

1.15 Test Run

UNIT 1 REVIEW TEST

Now that you know a little more about sports, try this review test.

1. Give the total points for these football teams.

	Team	Won	Lost	Tied	Total Points
(a)	Scars	12	3	5	
(b)	Blinders	11	4	5	
(c)	Knees	10	7	3	
(d)	Pads	10	2	8	
(e)	Terrors	9	9	2	
(f)	Revolts	8	7	5	
(g)	Kings	6	10	4	
(h)	Aces	2	2	16	

2. Jim had 38 hits at 279 times at bat. What is his batting average?

3. Louise allowed 79 earned runs in 321 innings. What is her ERA?

4. Gary earns $76 000/a. His league plays 85 games.
   (a) How much does he earn per game?
   (b) How much does he earn per period? (3-period games)

UNIT 2 PREVIEW TEST

You will need these skills for Unit 2:
- adding, subtracting decimal fractions
- multiplying, dividing decimal fractions
- percent to decimal fraction

Try this preview test.
How many questions can you do in your head?

1. Add.
   (a) $6.8 + 1.2 =$
   (b) $3.4 + 8.6 =$
   (c) $9.01 + 1.09 =$
   (d) $3.12 + 1.23 =$

2. Subtract.
   (a) $3.7 - 1.4 =$
   (b) $2.9 - 2.3 =$
   (c) $6.14 - 2.32 =$
   (d) $8.01 - 7.99 =$

3. Multiply.
   (a) $3.7 \times 2.1 =$
   (b) $1.01 \times 2.3 =$
   (c) $2.81 \times 1.3 =$
   (d) $6.15 \times 1.5 =$

4. Divide.
   (a) $6.4 \div 8 =$
   (b) $6.4 \div 0.8 =$
   (c) $8.13 \div 2.3 =$
   (d) $0.19 \div 0.2 =$

5. Change to decimal fractions.
   (a) 64% =
   (b) 92% =
   (c) 28% =
   (d) 6% =
   (e) 16% =
   (f) 28% =
   (g) 16.4% =
   (h) 29.7% =
   (i) 2.3% =
   (j) 1.08% =
   (k) 0.12% =
   (l) 0.069% =

TAKE-A-BREAK: ROUNDING OFF

Question: How much change did the football team owner get when he bought the player's contract?

Answer: He got a___ ___ .

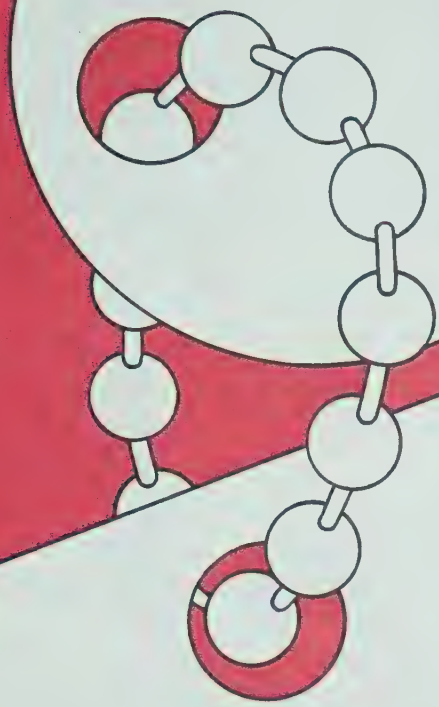
To complete the answer, round off these numbers to the hundredths place. Then use the code to fill in the letters.

3.157 =___ 1.194 =___ 0.686 =___ 0.927 =___ 2.812 =___
0.823 =___ 0.934 =___

0.839 =___ 0.691 =___ 0.312 =___ 1.808 =___

Math Code:

1.19 = U	0.84 = B
2.81 = T	0.93 = R
0.31 = C	0.69 = A
3.16 = Q	1.81 = K
	0.82 = E



UNIT 2
Automotive Math

People who use cars need Math.
This Unit will show you why.
Look at the topics in this Unit. They'll show why you, too, need Automotive Math.

2.1 Warm-up: Rounding Off Decimal Fractions
2.2 Warm-up: Adding and Subtracting Decimal Fractions
2.3 Warm-up: Multiplying and Dividing Decimal Fractions
2.4 Warm-up: Percents and Decimal Fractions
2.5 Reading an Odometer
2.6 Gasoline Costs
2.7 Fuel Consumption Rates
2.8 Comparing Fuel Costs
2.9 Recording Gas Purchases
2.10 Car Maintenance and Repair Costs
2.11 Automobile Depreciation
2.12 Think about it: Long-term Maintenance Costs
2.13 Test Run: Unit Review Test
Unit 3 Preview Test
Take-a-Break

Before you begin, try Warm-ups 2.1, 2.2, 2.3 and 2.4. They'll get you ready for Automotive Math.

2.1 Warm-up: Rounding Off Decimal Fractions

1. Round off to 1 decimal place.
   (a) 0.69
   (b) 0.62
   (c) 2.51
   (d) 2.55
   (e) 2.54
   (f) 12.51
   (g) 22.93
   (h) 27.68
   (i) 129.67
   (j) 433.66

2. Round off to 2 decimal places.
   (a) 0.663
   (b) 0.666
   (c) 2.542
   (d) 2.545
   (e) 2.541
   (f) 14.512
   (g) 12.517
   (h) 27.688
   (i) 129.675
   (j) 433.669

2.2 Warm-up: + and − with Decimal Fractions

There are 7 wrong answers in questions 1 and 2. Find them. Write the corrected answers in your notebook.

1. Add to check.
   (a) 2.4 + 6.9 + 7.8 = 17.1
   (b) 7.41 + 6.82 + 3.76 = 17.98
   (c) 9.36 + 8.37 + 8.38 = 26.19
   (d) 7.61 + 8.08 + 9.1 = 24.79
   (e) 46.31 + 6.8 + 7.46 + 6.87 = 804.89

2. Subtract to check.
   (a) 2.81 − 1.70 = 1.11
   (b) 37.64 − 16.53 = 11.14
   (c) 61.76 − 58.89 = 12.97
   (d) 912.348 − 876.499 = 146.959
   (e) 54.611 − 52.098 = 2.513
   (f) 84.7 − 69.87 = 4.83

2.3 Warm-up: × and ÷ with Decimal Fractions

1. Multiply or divide.
   (a) $\begin{array}{r} 3.1 \\ \times\ 8 \\ \hline 24.8 \end{array}$
   (b) $\begin{array}{r} 6.9 \\ \times\ 9 \\ \hline \end{array}$
   (c) $\begin{array}{r} 7.4 \\ \times\ 0.7 \\ \hline \end{array}$
   (d) $7\overline{)2.87}$ (0.41)
   (e) $8\overline{)72.24}$
   (f) $6\overline{)2.4}$

2. Multiply.
   (a) 0.21 × 0.14 =
   (b) 0.47 × 0.28 =
   (c) 0.91 × 0.13 =
   (d) 5.11 × 0.17 =
   (e) 7.84 × 0.13 =
   (f) 6.45 × 0.24 =

3. Divide.
   (a) 3.2 ÷ 8 =
   (b) 0.16 ÷ 4 =
   (c) 3.6 ÷ 18 =
   (d) 1.44 ÷ 1.2 =
   (e) 93.31 ÷ 0.31 =
   (f) 5.499 ÷ 6.11 =

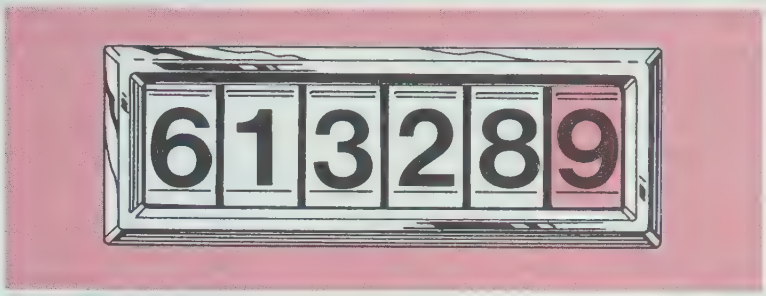
2.4 Warm-up: Percents and Decimal Fractions

1. Write these percents as decimal fractions.
   (a) 50% = 0.50
   (b) 25% =
   (c) 10% =
   (d) 40% =
   (e) 30% =
   (f) 15% =
   (g) 5% =
   (h) 8% =
   (i) 12.5% =

2. Write these decimal fractions as percents.
   (a) 0.75 = 75%
   (b) 0.61 =
   (c) 0.02 =
   (d) 0.39 =
   (e) 0.10 =
   (f) 0.1 =
   (g) 0.125 =
   (h) 0.178 =
   (i) 0.3904 =

2.5 Using an Odometer

When we drive, we often want to know how far we've travelled. The distance a car travels is measured by the *odometer*. This odometer shows a distance of 61328.9 km.



For example, Bob drove from Hamilton to Toronto. His odometer read 2412.3 at the beginning of the trip. It read 2485.7 at the end of the trip. How far did he travel?

DISTANCE TRAVELLED = FINAL ODOMETER READING − BEGINNING ODOMETER READING

Bob's distance travelled = 2485.7 − 2412.3

= 73.4 km

1. Write these odometer readings.

(a)	6 3 1 2 8	2
(b)	0 7 0 3 1	9
(c)	2 0 8 4 5	0
(d)	9 9 9 9 9	9
(e)	3 6 7 1 9	8

= 63 128.2 km

(f)	7 6 4 7 1	7
(g)	0 0 4 8 6	1
(h)	0 0 0 1 8	8
(i)	9 7 6 5 9	4
(j)	8 4 7 6 1	3

2. Find the distances travelled by these drivers.

	Driver	Beginning Reading	Final Reading	Distance Travelled
(a)	Tony	2438.7	2571.9	2571.9 − 2438.7 = 133.2
(b)	Marge	6917.6	7246.1	
(c)	Harry	14 638.9	14 694.3	
(d)	Ed	23 769.8	24 004.9	
(e)	Louise	46 784.3	51 821.4	
(f)	Joan	74 679.7	76 781.2	
(g)	Margo	104 809.3	104 898.5	
(h)	Frank	115 761.7	117 823.4	

(i) Who drove the farthest?

3. Estimate, then find the distances travelled by these drivers.

	Driver	Beginning Reading	Final Reading	ESTIMATE Distance Travelled	ACTUAL Distance Travelled
(a)	Louise	7641.8	8269.3	Think: "8200 − 7600 = 600 km"	8269.3 − 7641.8 = 627.5 km
(b)	Rob	9471.3	10 741.8		
(c)	Cal	10 497.8	11 694.1		
(d)	Jean	12 630.1	14 869.3		
(e)	Ruth	14 765.8	14 821.8		
(f)	Amy	72 684.3	84 617.3		
(g)	Peter	91 846.8	95 768.5		
(h)	Joe	112 684.3	114 691.4		

(i) Who travelled the longest distance?

(j) Who travelled the shortest distance?

Math YOU Need

4. After he has driven 0.1 km farther, Joe's odometer will "read" 99999.0. What does it "read" now?

5. What will it "read" after he has driven another 1 km?

2.6 Gasoline Costs

Gasoline costs will be a very expensive part of your budget when you buy a car. You need math to help you. For example, Helen bought 51.3 L of gas at 34.7¢/L. What was her total gasoline cost?

GASOLINE COST = TOTAL LITRES × COST PER LITRE

Helen's gasoline cost:
51.3 L × 34.7¢/L
= 1780.11¢
= 1780¢ (round to nearest cent)
= $17.80

```
  51.3
× 34.7
------
 3591
20520
153900
------
1780.11
```

Answer in cents is converted to dollars and cents.

1. Find the total costs for these gas purchases.

	Litres	Cost/Litre	Total Gasoline Cost
(a)	16	33.7¢	16 × 33.7 = 539¢ = $5.39
(b)	18	33.8¢	
(c)	21.3	32.6¢	
(d)	24.7	34.8¢	
(e)	31.6	35.7¢	

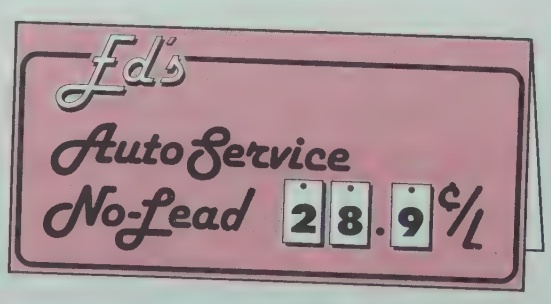
	Litres	Cost/Litre	Total Gasoline Cost
(f)	47	33.5¢	
(g)	61.3	36.2¢	
(h)	62.7	38.7¢	
(i)	71.3	34.7¢	
(j)	82.7	33.9¢	

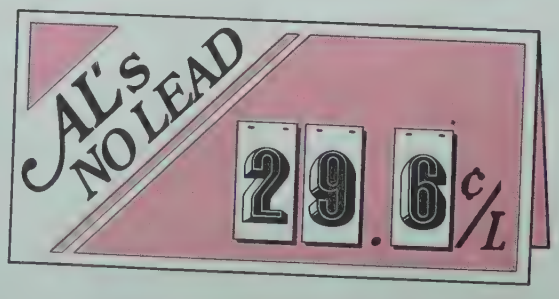
2. Estimate, then calculate the actual costs of these fill-ups.

	Litres	Cost/Litre	ESTIMATE Total Gasoline Cost	ACTUAL Total Gasoline Cost
(a)	37.8	34.7¢	40 L × 35 = $14.00	37.8 L × 34.7 = $13.12
(b)	25.4	34.5¢		
(c)	36.3	33.8¢		
(d)	40.1	31.7¢		
(e)	51.3	35.6¢		
(f)	64.7	37.8¢		
(g)	81.7	39.2¢		
(h)	84	33.5¢		
(i)	86.7	37.8¢		
(j)	88.3	36.7¢		

Math YOU Need

3.





(a) How much would it cost to fill up with 42.3 L of "no-lead" at Ed's?
(b) How much would it cost to fill up with 42.3 L of "no-lead" at Al's?
(c) How much money would you save if you bought 42.3 L of "no-lead" at Ed's?

2.7 Fuel Consumption Rates

Cars are given a fuel consumption rating. This rating tells the number of litres of gas used to travel 100 km. The lower the number the better the fuel consumption.

FUEL CONSUMPTION = (LITRES OF GAS USED ÷ KILOMETRES DRIVEN) × 100

Mary's car used 60 L of gasoline to drive 800 km. What was her fuel consumption rate?

Mary's fuel consumption = (60.0 L ÷ 800 km) × 100
= 0.075 × 100
= 7.5 L/100 km Fuel consumption is written as number of litres/100 km.

1. Find the fuel consumption rates for these drivers' cars (rounded to 1 decimal place).

	Driver	Car	Kilometres Driven	Litres Used	Fuel Consumption
(a)	Ed	Pacer	624.8	71.6	(71.6 ÷ 624.8) × 100 = 11.5 L/100 km
(b)	Jane	Fairmont	936.7	84.9	
(c)	Rob	Honda	321.5	21.6	
(d)	Jack	Chevette	487.6	37.8	
(e)	Ethel	Capri	947.0	97.3	
(f)	Pete	Triumph	631.3	55.5	
(g)	Joe	Subaru	848.7	72.3	
(h)	Ross	Rabbit	791.9	84.9	
(i)	Mary	Scirocco	841.3	67.6	
(j)	Denise	Corolla	246.8	17.8	

2. Estimate first, then find the fuel consumption for these drivers' cars (rounded to 1 decimal place).

	Driver	Car	Beginning	Final	Kilometres Driven	Litres Used	ESTIMATE Fuel Consumption	ACTUAL Fuel Consumption
(a)	Tony	Cadillac	71 416.0	71 739.0	71 739.0 − 71 416.0 = 323.0	57.6	(60 ÷ 300) × 100 = 20 L/100 km	(57.6 ÷ 323.0) × 100 = 17.8 L/100 km
(b)	Zelda	Omni	23 165.2	23 721.9		54.8		
(c)	Frank	Volvo	87 158.1	88 031.4		97.2		
(d)	Louise	Corona	15 623.1	16 341.8		67.2		
(e)	Mario	Marquis	35 714.8	36 028.3		43.9		
(f)	Tai	Camaro	16 648.2	16 721.9		12.3		
(g)	Cathy	Cordoba	45 324.6	46 216.7		96.8		
(h)	Chris	Skyhawk	67 046.4	68 256.7		154.3		

(i) Who had the lowest fuel consumption?
(j) Who had the highest fuel consumption?
(k) How many more litres does it take the driver in (c) to drive 100 km than the driver in (b)?

Math YOU Need

3. Which car would you recommend for:
   - Tony who works weekends delivering pizzas in Vancouver?
   - Sue who lives in Northern Ontario and is a teacher?
   - Ron who is married with four children?
   - Pam who is single and likes "sporty" automobiles?

   Use the information in questions 1 and 2.

2.8 Comparing Fuel Costs

Before you buy a car, you may want to find out what its fuel costs will be.

For example, a Volkswagen Rabbit Diesel uses 5.3 L of fuel to travel 100 km (Transport Canada gives the Rabbit Diesel a rating of 5.3 L/100 km). How much would the fuel cost be to drive a Rabbit Diesel 100 km?

FUEL COST = LITRES IN RATING × COST PER LITRE

Rabbit Diesel's fuel cost = 5.3 L × 35.6¢/L
= 188.68¢
= 189¢ rounded to nearest cent
= $1.89

1. Find the fuel costs to run these cars 100 km.

	Car	Rating	Cost/Litre	Fuel Cost
(a)	Austin Mini	7.3 L/100 km	32.7¢	7.3 × 32.7 = $2.39
(b)	Audi 5000 Diesel	8.1 L/100 km	32.7¢	
(c)	Chevrolet Malibu	9.9 L/100 km	32.7¢	
(d)	Buick Skylark	10.0 L/100 km	32.7¢	
(e)	AMC Concord	10.6 L/100 km	32.7¢	
(f)	Buick Century	12.4 L/100 km	32.7¢	
(g)	Cadillac Seville	13.9 L/100 km	32.7¢	
(h)	Rolls Royce	20.4 L/100 km	32.7¢	

2. Estimate, then calculate the fuel costs to run these cars 100 km.

	Car	Rating	Cost/Litre	ESTIMATE Fuel Cost	ACTUAL Fuel Cost
(a)	Chrysler Cordoba	12.6 L/100 km	34.8¢	13 × 35 = $4.55	12.6 × 34.8¢ = $4.38
(b)	Chevrolet Monza	12.9 L/100 km	34.8¢		
(c)	Volvo GLE	13.2 L/100 km	34.8¢		
(d)	Chevrolet Malibu	13.4 L/100 km	34.8¢		
(e)	Buick Electra	13.7 L/100 km	34.8¢		
(f)	Jaguar XKE	17.6 L/100 km	34.8¢		

3. Find the fuel cost of running each of these light trucks 100 km.

	Truck	Rating	Cost/Litre	Fuel Cost
(a)	Toyota Pickup	9.8 L/100 km	36.7¢	
(b)	GMC Caballero	11.2 L/100 km	36.7¢	
(c)	Ford F100/150	12.2 L/100 km	36.7¢	
(d)	Dodge D150 pickup	12.8 L/100 km	36.7¢	
(e)	Chevrolet G10	14.0 L/100 km	36.7¢	
(f)	Dodge Little Express	18.7 L/100 km	36.7¢	

(g) How much cheaper is it to travel 100 km in a Toyota Pickup than in a Dodge Little Express?

Math YOU Need

4. Rick has to be in Winnipeg next Saturday. The trip is 300 km one way. Which way is cheaper:
   (a) drive with Mary and share fuel costs (Buick Skylark; fuel at 36.8¢/L)? or . . . (b) buy a bus ticket for $10.00 (one way)?

2.9 Recording Gas Purchases

Many people keep a record of their gas purchases. It helps them to calculate their fuel consumption rate.

For example, George paid $9.52 to fill up his gas tank after he had driven 273 km. What was his gas cost per 100 km?

OCTOBER 1983 AUTO RECORD

DAY	START	STOP	KILOMETRES	GAS	COST
1					
2					
3					

GAS COST PER 100 km = (COST FOR FILL-UP ÷ DISTANCE TRAVELLED) × 100
George's gas cost per 100 km = ($9.52 ÷ 273 km) × 100
= (0.0349) × 100
= $3.49/100 km

1. George took a trip from Vancouver to Winnipeg in July. Copy and complete this trip record chart.

	Date	Odometer Reading Beginning	Final	Kilometres Driven	Cost of Fill-up	Cost/100 km
(a)	July 1	61 347.9			Full tank	
(b)	July 2	61 347.9	61 763 .2	415.3	$12.06	(12.06 ÷ 415.3) × 100 =
(c)	July 3	61 763 .2	62 005.8		$ 7.98	$2.90/100 km
(d)	July 4	62 005.8	62 429.1		$11.75	
(e)	July 5	62 429.1	62 988.4		$14.13	
(f)	July 6	62 988.4	63 327.6		$13.27	
(g)	July 7	63 327.6	63 680.4		$11.75	
(h)	July 8	63 680.4	64 008.9		$14.64	
(i)	July 9	64 008.9	64 371.7		$ 8.54	
(j)	July 10	64 371.7	64 52 6.1		$ 6.56	

2. (a) Copy and complete this record sheet for a holiday trip Sandra took from Ottawa to Regina.

Date	Odometer Reading Beginning	Final	Kilometres Driven	Litres Purchased	Cost/ Litre	Cost of Fill up	Fuel Consumption	Cost/100 km
Dec. 26	51 372.0			Full Tank				
Dec. 27	51 372.0	51 570.0	51 570.0 − 51 372.0 = 198	27.2	34.6¢	27.2 × 34.6 = $9.41	(27.2 ÷ 198) × 100 = 13.74	($9.41 ÷ 198) × 100 = $4.75
Dec. 28	51 570.0	51 727.3		24.2	34.7¢			
Dec. 29	51 727.3	51 947.8		41.8	33.6¢			
Dec. 30	51 947.8	52 280.9		51 .3	35.7¢			
Dec. 31	52 280.9	52 565.6		52 .2	36.8¢			
Jan. 1	52 565.6	52 848.4		59.1	34.6¢			
Jan. 2	52 848.4	53 056.5		33.1	35.7¢			
Jan. 3	53 056.5	53 334.2		52 .7	38.3¢			
Jan. 4	53 334.2	53 601.1		46.3	37.6¢			

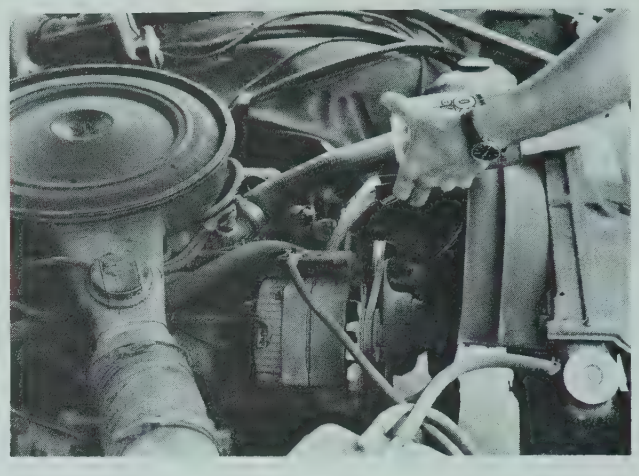
(b) Estimate, then find the total distance travelled by Sandra.
(c) Estimate, then find the total number of litres of gas purchased.
(d) Estimate, then find the total cost of the fill-ups.

Math YOU Need

3. If these were your odometer readings for 4 weeks, what do you think the odometer reading for Week 5 will be? Estimate.

	ODOMETER READINGS	
	Beginning	Final
Week 1	53 804	54109
Week 2	54109	54410
Week 3	54410	54699
Week 4	54699	55002

2.10 Car Maintenance and Repair Costs



If you buy a car you'll find that repair and maintenance costs can be expensive. You'll need to know how to figure them out.

For example, Pete had his oil changed. What was his total repair cost?

PARTS COST = NUMBER OF ITEMS USED × COST PER ITEM
= 4 L of oil × $1.60/L
= $6.40

LABOUR COSTS = NUMBER OF HOURS WORKED × CHARGE PER HOUR
= 0.5 h × $22.00/h
= $11.00

TOTAL REPAIR COST = PARTS COST + LABOUR COST
= $6.40 + $11.00
= $17.40

1. Cathy's Dodge Omni needed a lot of repair work. Copy and complete this worksheet. (Labour costs are $22.00/h).

	Item	Total Number Needed	Cost/ Item	Parts Cost	Hours of Labour	Labour Cost	Cost of Repair
(a)	oil filter	1	$3.50	1 × $3.50 = $3.50	0.1	0.1 × $22 = $2.20	$3.50 + $2.20 = $5.70
(b)	air filter	1	$5.00		none		
(c)	fuel filter	1	$4.25		0.1		
(d)	fan belt	2	$5.00		0.2		
(e)	headlights	2	$4.50		0.2		
(f)	wiper blades	1 pr.	$5.00/pr.		0.1		
(g)	muffler tailpipe	1	$43.00		0.8		
(h)	shock absorbers	4	$18.95		1.1		
(i)	tires	4	$55.00		0.5		
(j)	tire balancing	none	none		0.3		

2. Calculate the total cost of repairs for the work done on Bob's 1969 Dodge Coronet.

	Item	Total Number Needed	Cost/ Item	Parts Cost	Hours of Labour	Labour Cost @ $21.00/h	Cost of Repair
(a)	oil	2 L	$1.60/L		0.1		
(b)	PCV valve	1	$3.60		0.2		
(c)	power steering pump	1	$38.00		1.5		
(d)	carburetor tune-up	1 kit	$17.50		1.7		
(e)	alternator bearings	4	$1.75		2.3		
(f)	radiator	1	$95.00		2.7		
(g)	radiator coolant	3 L	$2.60/L		0.2		
(h)	radiator anti-rust	1 L	$2.85/L		0.1		
(i)	oil gauge	1	$6.55		0.8		
(j)	thermostat	1	$7.65		0.5		
(k)	TOTAL COST OF REPAIRS =						

Math YOU Need

3. Bob's friend, Rick, is a mechanic. If Rick did the repairs on Bob's car (question 2) without the usual charges for labour, how much would Bob save?

2.11 Automobile Depreciation

A car drops in value as it gets older. This is called *depreciation*. You'll want to know how depreciation is calculated.

Average depreciation rates are given as percents of the original price.

first year depreciation	= 35%
second year depreciation	= 17%
third year depreciation	= 13%
fourth year depreciation	= 11%
fifth year depreciation	= 8%

For example, a new Toyota Celica sells for approximately $8480. What amount of money will it depreciate in the third year?

DEPRECIATION IN A GIVEN YEAR = NEW CAR PRICE × RATE OF DEPRECIATION

Toyota Celica's depreciation = $8480 × 13%
= $8480 × 0.13 ← $\left(13\% = \frac{13}{100} = 0.13\right)$
= $1102.40

Another example:
Joanne bought her new Mazda for $6895. What will be its market value after 2 a? Use the average depreciation rate.

TOTAL DEPRECIATION = NEW CAR PRICE × SUM OF THE RATES OF DEPRECIATION FOR EACH YEAR.

= $6895 × (35% + 17%)
= $6895 × 52%
= $6895 × 0.52
= $3585.40

1. How much will these cars depreciate in the years given?

	Car	New Car Price	Year	Amount of Depreciation
(a)	Malibu	$ 6835	third	$6835 × 0.13
(b)	Mustang	$ 7492	second	= $888.55
(c)	Lemans	$ 5379	fourth	
(d)	New Yorker	$13 472	first	
(e)	Corvette	$19 738	fifth	

	Car	New Car Price	Year	Amount of Depreciation
(f)	Concord	$9982	first	
(g)	Bobcat	$5136	second	
(h)	Accord	$8569	third	
(i)	Civic	$5250	fourth	
(j)	Zephyr	$6196	fifth	

2. Find the value of these cars after they have depreciated.

	Car	New Car Price	Year	Total Amount of Depreciation	Value of Car (New Car Price − Amount of Depreciation)
(a)	Cutlass	$ 8470	second	$8470 × 0.52	$8470.00 − $4404.40 = $4065.60
(b)	Monza	$ 9760	third	= $4404.40	
(c)	Lada	$ 4560	second		
(d)	Acadian	$ 5175	fourth		
(e)	Toronado	$13 550	third		

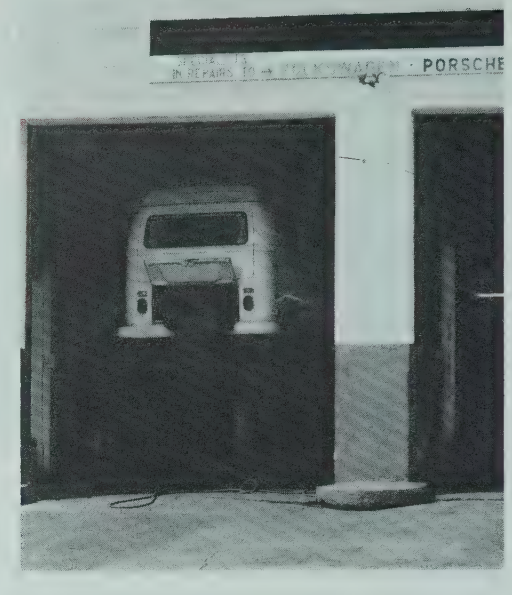
3. Estimate, then determine the value of Jill's LeSabre in each of its first five years.

	Car	Year	Amount of Depreciation	ESTIMATE Value of Car	ACTUAL Value of Car
(a)	LeSabre	first	$9875 × 0.35	$10 000 − $3400	$9875.00 − $3456.25 = $6418.75
(b)	New Car	second	= $3456.25	= $6600	$6418.75 − $_____ = $_____
(c)	Price:	third			
(d)	$9875	fourth			
(e)		fifth			

Math YOU Need

4. Rashad was offered $1000.00 for his 5 a old car. He paid $4000 for the car when it was new. Should he take the $1000.00?

2.12 Think About It: Long-term Maintenance Costs



Car owners sometimes calculate the cost of running a car over a number of years. This is long-term automobile maintenance.

For example, Helen owns a 1978 Pontiac Lemans.

(a) How many oil changes will she need in 5 a or 100 000 km?

(b) How much will oil changes cost her over a 5 a period or 100 000 km?

(a) NUMBER OF REPLACEMENTS = 100 000 km ÷ REPLACEMENT INTERVAL

Helen's oil is changed every 6000 km.

Number of oil changes = 100 000 km ÷ 6000 km

= 17 ← rounded to units place

(b) 5 a MAINTENANCE COST = NUMBER OF REPLACEMENTS × COST OF ONE REPLACEMENT (OR REPAIR)

Helen's oil change costs $10.00 per change.

5 a maintenance cost = 17 × $10.00

= $170.00

1. Complete this 5 a maintenance sheet for Helen's Lemans.

	Item	Replacement Interval	Number of Replacement Intervals	Cost of Replacement	5 a Maintenance Cost
(a)	oil filter	6000 km	100 000 ÷ 6000 = 17	$7.70	17 × $7.70 = $130.90
(b)	air filter	10 000 km		$12.00	
(c)	fuel filter	20 000 km		$6.75	
(d)	fan belt	50 000 km		$10.00	
(e)	headlights	40 000 km		$18.00/pr	
(f)	wiper blades	every year		$7.50/pr	
(g)	muffler tail pipe	50 000 km		$79.25	
(h)	shock absorber	50 000 km		$50.45/pr	
(i)	tire rotation	10 000 km		$16.00	
(j)	tires (4)	50 000 km		$140.00/4	
(k)	tire balancing	10 000 km		$24.00	
(l)	battery	every 3 a		$70.00	
(m)	spark plugs	10 000 km		$19.84/set	
(n)	lubrication	10 000 km		$15.00	
(o)	front end alignment	20 000 km		$35.00	

2. What is the total cost of all the replacements in question 1?

3. What would be the approximate cost for Helen to maintain her car for 1 a?

2.13 Test-Run

UNIT 2 REVIEW TEST

Now that you've completed the Unit on Automotive Math, try the Unit 2 Review Test and find out what you've learned.

1. Calculate these fuel-consumption rates for 100 km.

	Person/Car	Distance Driven	Litres Used	Rate
(a)	Paula's PONTIAC	1200 km	140 L	
(b)	Mark's MONZA	850 km	75 L	
(c)	Diane's DODGE	775 km	89.9 L	
(d)	Joe's CITATION	478.6 km	36.2 L	
(e)	Wendy's HONDA	223.9 km	16.4 L	
(f)	Lesley's PACER	311.7 km	19.8 L	
(g)	Mindy's MUSTANG	610.3 km	52.4 L	
(h)	Charlie's CHEV	592.8 km	37.3 L	
(i)	Judy's BUICK	1900.6 km	170.7 L	
(j)	Sue's TOYOTA	480.4 km	32.8 L	

2. Which car has the lowest consumption rate?

3. Which car has the worst consumption rate?

4. If gasoline costs 36.8¢/L, how much would it cost to drive 100 km in:
   (a) Al's LINCOLN (20.4 L/100 km)?
   (b) Trudy's VOLVO (13.2 L/100 km)?

UNIT 3 PREVIEW TEST

You'll need these skills for UNIT 3:
- rounding off decimal fractions
- multiplying whole numbers
- changing percents to decimal fractions

1. Round to 1 decimal place.
   (a) 0.12
   (b) 0.19
   (c) 0.26
   (d) 2.15
   (e) 2.151
   (f) 17.091
   (g) 9.137
   (h) 98.168
   (i) 99.399
   (j) 99.999

2. Multiply.
   (a) $9 \times 9 =$
   (b) $7 \times 5 =$
   (c) $6 \times 2 =$
   (d) $12 \times 4 =$
   (e) $12 \times 6 =$
   (f) $111 \times 9 =$
   (g) $211 \times 9 =$
   (h) $202 \times 9 =$
   (i) $21 \times 12 =$
   (j) $32 \times 25 =$

3. Change these per cents to decimals.
   (a) 50%
   (b) 20%
   (c) 25%
   (d) 78%
   (e) 10%
   (f) 9%

TAKE-A-BREAK: × AND ÷ WITH WHOLE NUMBERS AND DECIMAL FRACTIONS

Question: What do some used cars need?

Answer: Multiply or divide. Then use the code to find the answer.

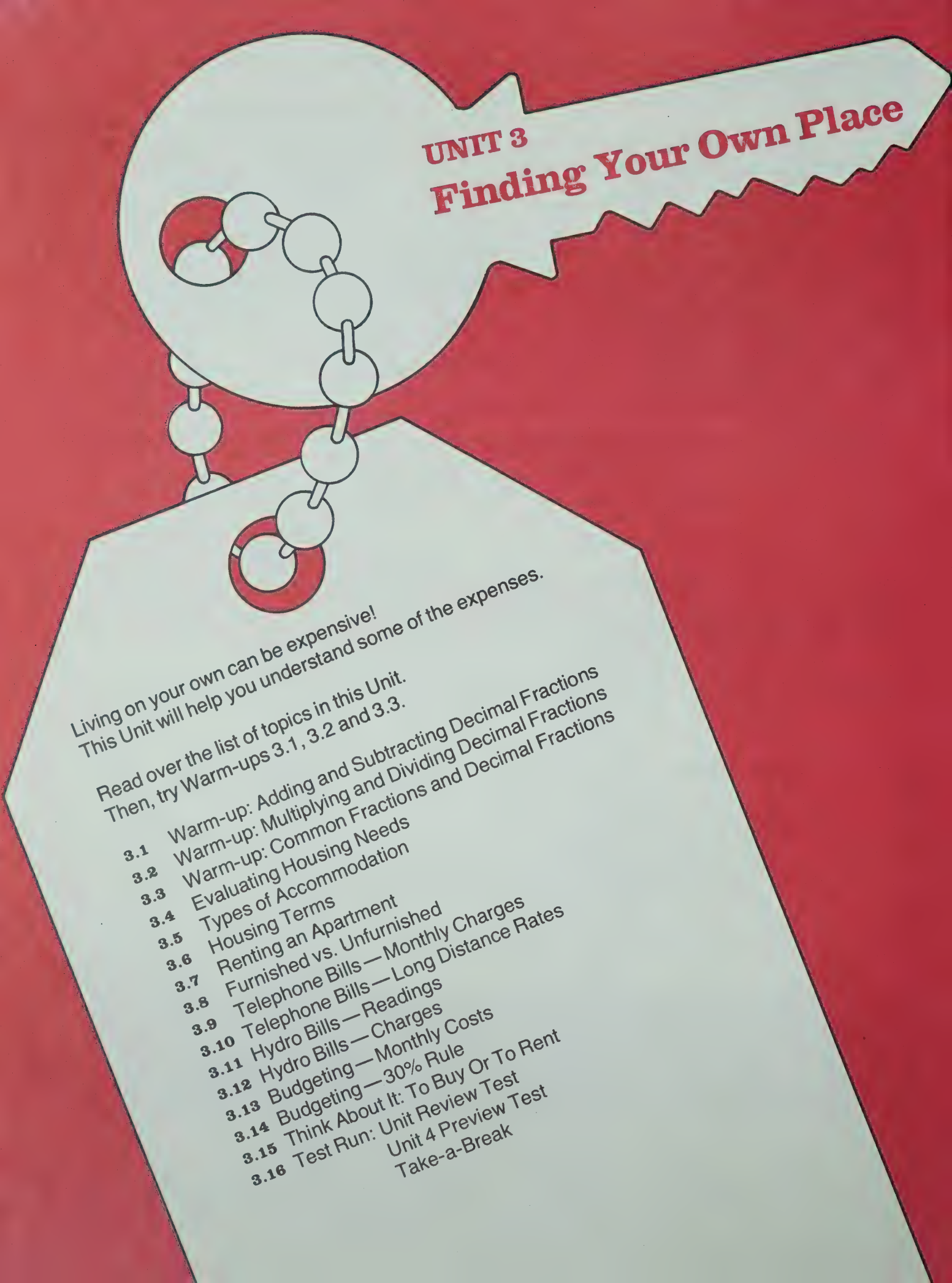
$0.5 \times 1.0 =$___ $0.2 \times 4.0 =$___ $4.9 \div 7.0 =$___ $1.2 \div 4.0 =$___

$0.2 \div 0.5 =$___

$0.2 \times 3.0 =$___ $1.0 \div 5.0 =$___ $0.025 \times 4.0 =$___

Math Code:

0.8 = E	0.1 = D
0.3 = O	0.4 = N
0.6 = A	0.2 = I
0.5 = L	0.7 = M



UNIT 3
Finding Your Own Place

Living on your own can be expensive!
This Unit will help you understand some of the expenses.

Read over the list of topics in this Unit.
Then, try Warm-ups 3.1, 3.2 and 3.3.

3.1 Warm-up: Adding and Subtracting Decimal Fractions
3.2 Warm-up: Multiplying and Dividing Decimal Fractions
3.3 Warm-up: Common Fractions and Decimal Fractions
3.4 Evaluating Housing Needs
3.5 Types of Accommodation
3.6 Housing Terms
3.7 Renting an Apartment
3.8 Furnished vs. Unfurnished
3.9 Telephone Bills — Monthly Charges
3.10 Telephone Bills — Long Distance Rates
3.11 Hydro Bills — Readings
3.12 Hydro Bills — Charges
3.13 Budgeting — Monthly Costs
3.14 Budgeting — 30% Rule
3.15 Think About It: To Buy Or To Rent
3.16 Test Run: Unit Review Test
Unit 4 Preview Test
Take-a-Break

3.1 Warm-up: + and − with Decimal Fractions

1. Add.

(a)	(b)	(c)	(d)	(e)
6.31	7.48	61.37	0.314	0.0034
7.92	81.39	84.89	0.32	8.02495
8.45	6.84	3.71	2.716	67.132

2. Subtract.

(a)	(b)	(c)	(d)	(e)
6.98	183.79	87.316	0.3147	1.8462
− 3.71	− 62.64	− 69.784	− 0.2879	− 1.6897

3.2 Warm-up: × and ÷ with Decimal Fractions

There are 5 wrong answers in questions 1 and 2. Find them. Write the corrected answers to the nearest thousandth, in your notebook.

1. Multiply to check.
   (a) $6.3 \times 7 = 44.1$
   (b) $4.8 \times 12 = 57.5$
   (c) $7.3 \times 21 = 153.3$
   (d) $0.64 \times 14 = 8.96$
   (e) $7.2 \times 0.3 = 1.16$
   (f) $6.3 \times 0.12 = 0.756$

2. Divide to check.
   (a) $3.12 \div 6 = 0.52$
   (b) $9.613 \div 8 = 1.211$
   (c) $9.76 \div 4 = 2.54$
   (d) $0.7917 \div 0.46 = 1.721$
   (e) $9.137 \div 8.4 = 1.088$
   (f) $0.3231 \div 0.91 = 0.345$

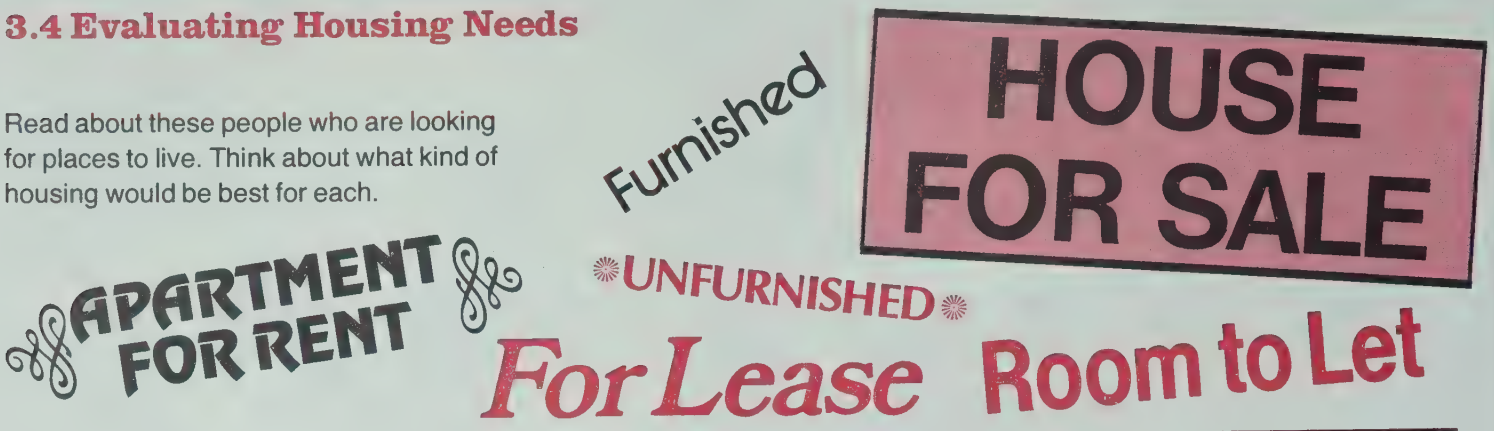
3.3 Warm-up: Common Fractions and Decimal Fractions

1. Change these common fractions to decimal fractions.
   (a) $\frac{1}{2} = 0.5$
   (b) $\frac{1}{4} =$
   (c) $\frac{3}{4} =$
   (d) $\frac{1}{8} =$
   (e) $\frac{1}{10} =$
   (f) $\frac{2}{5} =$

2. Change these decimal fractions to common fractions.
   (a) $0.6 = \frac{6}{10}$
   (b) $0.34 =$
   (c) $0.19 =$
   (d) $0.02 =$
   (e) $0.008 =$
   (f) $0.109 =$

3.4 Evaluating Housing Needs

Read about these people who are looking for places to live. Think about what kind of housing would be best for each.



- Jim Hudson is 18 years old. His family lives in Lethbridge. He just got a job at Ace Service Station in Calgary as an apprentice mechanic. Jim hates doing housework and cooking. He's not sure how long he'll stay in Calgary.

- Maria Nugyen and Kelly Scott are both 19. They are secretaries, working for Helpful Tax Services in Vancouver. They want to share a place. Each girl would like some privacy. They have also saved a few hundred dollars to buy furniture.

- Danny Wills, 24, and Tina D'Angelo, 23, are getting married in the summer. They have been working for several years, and have saved $5000. Tina would like a garden. Danny has woodworking equipment he uses in his spare time. Tina has a pet cat. The couple would like to start a family soon.

- Helen and Tony Demarco have been married for one year. They are living in an adults-only apartment. Because Helen is pregnant, they must move out when the lease expires in two months. They would like more living space. Tony has been laid off and they have very little money saved.

- David Walker is 30 and has decided not to get married. He is a highly-paid copy writer with the Dwight Advertising Agency in Toronto. David travels on his vacations. He spends winter weekends at his friend's ski chalet. David likes to entertain by having parties and inviting clients home for dinner.

1. Copy this chart into your notebook. Complete it by filling in the names of the person or couple from above that would best suit the type of housing. (There may be more than one type for each person or couple.)

	Type of Housing	Person, Couple Best Suited For
(a)	bachelor apt. unfurnished	
(b)	bachelor apt. furnished	
(c)	1-bdrm. apt. unfurnished	
(d)	1-bdrm. apt. furnished	
(e)	2-bdrm. apt. unfurnished	
(f)	2-bdrm. apt. furnished	
(g)	rental of house, unfurnished	
(h)	rental of house, furnished	
(i)	rental of basement apt.	

	Type of Housing	Person, Couple Best Suited For
(j)	3-bdrm. townhouse, to buy	
(k)	3-bdrm. semi-detached, to buy	
(l)	3-bdrm. bungalow, to buy	
(m)	rental of room, rooming house	
(n)	mobile home, to buy	
(o)	farm, 50 km from city	
(p)	condominium apt. to buy	
(q)	3-bdrm. townhouse, to rent	
(r)	mobile home, to rent	

Math YOU Need

2. Could Danny and Tina afford to buy a $125 000 house? Give a reason for your answer.

3. David Walker's rent is going up $400 more per month. Should David
   (a) stay where he is; or (b) try to buy a condominium apartment?

3.5 Types of Accommodation

A newspaper is a good place to look for accommodations. Read these ads, then follow the directions in question 1.

CLASSIFIED ADS

Room And Board
LARGE single private room, pack lunches, laundry. Central location. Suit man or male student. 527-7808

Townhouses To Rent
3-bedroom Townhouse to rent from $440 a month, includes 4 appliances, full basement, broadloom. 389-5555

Condominium Apartments FOR SALE
MAGNIFICENT 2 BR suite, 150 m² with 2 full baths, 5 appliances, luxurious broadloom, exceptional view of the bay. Call after 13:00, 524-6817, Allan.

8TH floor, large LR, Dining area, den, fully equipped kitchen, new fridge, stove, dishwasher, dryer and washer, 2 large BRs, 1½ baths, ungraded rugs, beautiful view of Toronto, Hamilton, overlooking Lake Ontario at Stoney Creek. Price firm $95 000. Owner moving to Penthouse. 674-5239

HOUSES FOR SALE
BRAND NEW 6 room 1 floor plan and garage, basement semi fin. for additional 4 rooms, fantastic value. Low down. Asking only $78 900. Call Andy 389-2241.

SUPER BUY! Near shopping and bus. Three bedrooms, separate dining room, family room. Priced at $66 900. Open for offers. Call MARGARET 525-4859 or 537-4376.

Apartments To Rent Unfurnished
LA TORRE PLACE. 2 Bedroom $206. Rent Includes: hydro, heat, underground parking, swimming pool, saunas and exercise rooms, tennis court and playground. Spacious, modern apts. in parklike setting. Apply #108. 568-5536

Rooms Furnished
ROOM apt., frig and stove. Adults only. $185 a month, hydro and heat included. Nurse or couple. 525-7863

Houses To Rent
NEWLY built bungalow with garage, living room, kitchen and eating area, 3 bedrooms, rec. room with fireplace, separate laundry area. $825 month. Call Mario at Fen Real Estate, Realtor 388-8255

PET lovers! East end, good home, $350, fenced for kids, pets, 545-8942, Homelocator's fee.

Townhouses For Sale
PRIVATE luxury 3-4 BR townhouse, sunken LR, sep. DR, family room. Garage. Call 387-0139, $142 500.

Townhouses For Sale
"3 YEARS NEW" Lovely 3-bedroom semi on desirable west mountain — completely fenced rear yard — partly finished rec. room. Asking $94 900 including the lot! Call Neil 379-2355.

Apartments To Rent Unfurnished
100 BAY STREET SOUTH. (Across from City Hall). 1 Bedroom — $248.00 CALL FOR APPOINTMENT 545-0825

1. Copy this chart into your notebook.
   - Choose a dwelling for each person or couple from the above ads.
   - Give reasons why you chose the particular dwellings.

	Name	Place from Ads	Reasons for choice
(a)	Jim Hudson		
(b)	Maria Nugyen Kelly Scott		
(c)	Danny Wills Tina D'Angelo		
(d)	Helen & Tony Demarco		
(e)	David Walker		

Math YOU Need

2. Why is it better for Maria and Kelly to rent? Give a reason for your answer.

3. Select a place you would like to live in from a newspaper. How much would you have to earn to live there?

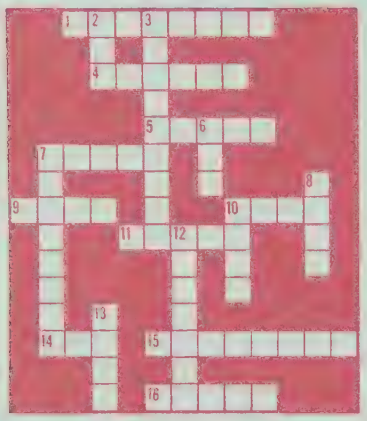
3.6 Housing Terms

Many terms are used in the housing business. This page gives some of them and their meanings.

1. Match the terms in Column A with the definitions in Column B. One is done for you.

COLUMN A	COLUMN B
(a) lease	— to rent a dwelling with time left on a lease
(b) sublet	— an apartment with furniture and cooking facilities
(c) unfurnished	— a sum of money to be paid when taking possession of a bought dwelling
(d) mortgage	— two houses that are attached by a common wall
(e) down payment	— several attached houses usually in a row or grouped; each owner owns his or her house, but all owners own the property together
(f) utilities	(a) — an agreement to rent a dwelling place
(g) room and board	— a house on its own, not joined to others
(h) furnished apartment	— without furniture
(i) townhouse	— renting a bedroom in a house, with meals provided
(j) condominium apartment	— apartment for sale
(k) semi-detached	— like a townhouse, but the owner owns his or her property alone
(l) detached	— hydro, heating, water, etc.
(m) street home	— a special loan for buying a dwelling
(n) HUDAC	— money paid to a lawyer when buying a dwelling
(o) closing fees	— a new-home warranty

2. Complete this crossword of housing terms.



ACROSS

1. What you pay off when you buy a house.
4. A person who handles housing deals.
5. Electricity supplied to a dwelling.
7. Short for "condominium".
9. A legal document showing ownership.
10. Interest _____ .
11. What you sign when renting something.
14. Property _____ .
15. Level of a house underground.
16. Level at very top of a house.

DOWN

2. Heating fuel.
3. A house attached to other houses.
6. Another term for "family room".
7. A kind of street.
8. _____ -detached.
10. "We don't want to buy; we want to _____ ".
12. Black covering on a driveway.
13. A sign found at the end of apartment hallways.

Math YOU Need

3. Most mortgages have 3 a or 5 a "terms", but are paid off in 20 a or 25 a. What is a mortgage "term"?

3.7 Renting An Apartment

Renting an apartment depends on how much you can afford. For example, Maria and Kelly have decided to rent a 2-bedroom apartment. It is on the 12th floor of the building. Monthly rent is $350 plus $5 for each floor. What is the total monthly rent for their apartment?

TOTAL MONTHLY RENT = RENT + ($5 × NUMBER OF FLOORS)

Maria's and Kelly's total monthly rent = $350 + ($5 × 12 floors)
= $350 + $60
= $410

1. Calculate these rental costs for Maria and Kelly. (They have agreed to split the costs equally.)

	Renters	Total Monthly Rent	Amount Paid by Each Person per Month	Amount Paid by Each Person over 12 Months
(a)	Maria Nugyen			
(b)	Kelly Scott			

(c) How much will the girls have to pay in total rent over 12 months?
(d) Each girl earns $12 000/a. How much of each girl's salary will be left after paying her portion of rent?

2. Complete this information sheet for Jim Hudson and David Walker.

	Renter	Salary per Year	Apartment Rented	Monthly Rent	Total Monthly Rent	Total Rent paid over 12 Months	Amount of salary left After Rent
(a)	Jim Hudson	$11 480	1-bedroom, 7th floor	$265 plus $4 per floor			
(b)	David Walker	$35 000	Penthouse, 25th floor	$780 plus $10 per floor			

3. Calculate the monthly and yearly rental costs for these people.

	Renter	Apartment Rented	Monthly Rent	Total Monthly Rent	Total Rent Paid over 12 Months
(a)	Harry	2-bedroom, 4th floor	$310 + $5/floor		
(b)	Wilma	1-bedroom, 8th floor	$280 + $6/floor		
(c)	Peter	3-bedroom, 9th floor	$375 + $8/floor		
(d)	Mary	Penthouse, 17th floor	$550 + $11/floor		

Math YOU Need

4. Most people sign a lease when they rent an apartment.
   (a) What are some advantages of having a lease?
   (b) What are some disadvantages of having a lease?

5. Could Maria and Kelly afford a $750/month apartment? Use the information in question 1.

3.8 Furnished vs. Unfurnished

Is it better to rent a furnished apartment or an unfurnished one? This page will help you to decide which is the "better" deal.

1. Danny and Tina Wills are thinking about renting a 2-bedroom apartment. They have these options to choose from:

APARTMENT 206:	APARTMENT 207:	APARTMENT 208:
furnished with bedroom, living room, and dining room furniture $565 per month.	unfurnished; rent is $350 per month; bedroom, living room, dining room furniture can be rented from Brock Furniture for $250 per month.	unfurnished; rent is $350 per month; couple can buy bedroom, living room and dining room furniture from Brock Furniture for $2000. The couple can pay the $2000 in 12 payments of $190 each.

(a) Which of the three options is cheapest per month?
(b) Which of the three options is cheapest over 12 months?
(c) Which of the three options do you feel is the best deal?

2. Estimate, then calculate the amount David Walker would have to pay for each of these 2-bedroom apartments.

	APARTMENT 1211: furnished, living, dining, and bedroom furniture; $885 per month	APARTMENT 1212: unfurnished, rent is $560 per month, furniture rental from Art Galleries; living, dining and bedroom combination for $320 per month	APARTMENT 1213: unfurnished; rent is $560 per month; furniture bought from Art Galleries: living, dining, bedroom combination for $4200 or $402 per month for 12 months
(a)	ESTIMATE, 12-month cost =	ESTIMATE, monthly cost = ESTIMATE, 12-month cost =	ESTIMATE, monthly cost = ESTIMATE, 12-month cost =
(b)	ACTUAL, 12-month cost =	ACTUAL, monthly cost = ACTUAL, 12-month cost =	ACTUAL, monthly cost = ACTUAL, 12-month cost =

3. Copy and complete this chart in your notebook, using point form ideas.

(a)	Advantages of renting a furnished apartment	Disadvantages of renting a furnished apartment
(b)	Advantages of renting furniture for an unfurnished apartment	Disadvantages of renting furniture for an unfurnished apartment
(c)	Advantages of buying furniture for an unfurnished apartment	Disadvantages of buying furniture for an unfurnished apartment

Math YOU Need

4. David Walker decided to rent Apartment 1212. The rent went up 25% when he signed the lease. What is David's new monthly payment? Use the information in question 2.

3.9 Telephone Bills—Monthly Charges

Anyone who has a telephone gets something every month—the bill!

A telephone bill shows
(a) basic monthly charges, and
(b) long distance calls.

The basic monthly charge depends on,
(a) where you live,
(b) how many phones you have,
(c) colour,
(d) type of phone (dial, push button, contempra).

The monthly charges are made up of:

	basic rate (1 black dial phone)	= $7.35/month
extra charges	extension	= extra $2.00 each month
	push button	= extra $2.75/month (any colour)
	contempra	= extra $2.75 each month (any colour)
	colour	= 1 charge of $12.55 for colour dial phones

For example, Maria and Kelly decided to have 1 yellow push button contempra phone. What will their monthly charge be?

MONTHLY CHARGE = BASIC MONTHLY RATE + EXTRAS

Maria and Kelly's monthly charge = $7.35
2.75 push button
2.75 contempra
$12.85

1. Calculate the monthly phone charge for these families.

	Family	Telephone Service	Monthly Charge
(a)	Walmer	1 basic black; 2 black extensions	$7.35 + $4.00 = $11.35
(b)	Osgoode	2 contempras	
(c)	Terry	1 green push button; 1 basic black extension	
(d)	Talmon	3 green push buttons	
(e)	Lapointe	2 basic blacks; 3 green extension dial phones	

2. Estimate, then calculate the monthly phone charge for these families.

	Family	Telephone Service	ESTIMATE Monthly Charge	ACTUAL Monthly Charge
(a)	Wilson	2 contempra push button; 1 basic black		
(b)	O'Reilly	1 basic black; contempra dial		
(c)	Thomas	2 green dial phones		
(d)	Kent	4 basic black phones		
(e)	Rae	2 contempra dial; 1 basic black		

Math YOU Need

3. How much would the Wilsons save per year if they just had one basic black phone? Use the information in question 2.

3.10 Telephone Bills—Long Distance Rates

Remember: that "long distance feeling" will cost you money!

Long distance charges depend on
(a) where you call
(b) what time you call, and
(c) how long you talk.

Telephone companies have schedules of discount rates. These discounts are subtracted from the total cost of the call.

Monday to Friday	08:00 to 18:00	No discount
Monday to Friday	18:00 to 23:00	1/3 off
Saturday	08:00 to noon	No discount
Saturday	noon to 23:00	2/3 off
Sunday	08:00 to 18:00	2/3 off
Sunday	18:00 to 23:00	1/2 off
Daily	23:00 to 08:00	2/3 off

The cost-per-minute rate varies. The longer the distance, the higher the cost-per-minute rate. For example,

Jerry called from Hamilton, Ontario to Belleville, Ontario on Tuesday at 20:00. He talked for 4 min. The rate was $0.42/min. What was his long distance charge?

LONG DISTANCE CHARGE = (COST/MINUTE RATE × MINUTES TALKED) − (DISCOUNT)

Jerry's long distance charge = ($0.42 × 4 min) − (1/3 discount)
= ($1.68) − (1/3 of $1.68)
= $1.68 − $0.56
= $1.12

1. Calculate the costs of these long distance calls.

	Call: from Hamilton to	Cost/ Minute	Minutes talked	Regular charge	Discount Rates	Discount Amount	Long Distance Charge
(a)	Guelph	$0.22	10	$0.22 × 10	1/2 off	1/2 of $2.20	$2.20 − $1.10
(b)	Montreal	$0.53	6	= $2.20	1/3 off	= $1.10	= $1.10
(c)	Niagara Falls	$0.32	15		no discount		
(d)	Toronto	$0.25	8		2/3 off		
(e)	Windsor	$0.44	3		2/3 off		
(f)	St. Catherines	$0.26	9		1/2 off		
(g)	Moosonee	$0.58	5		no discount		
(h)	Oakville	$0.17	2		1/3 off		

2. Calculate the costs of these long distance calls.

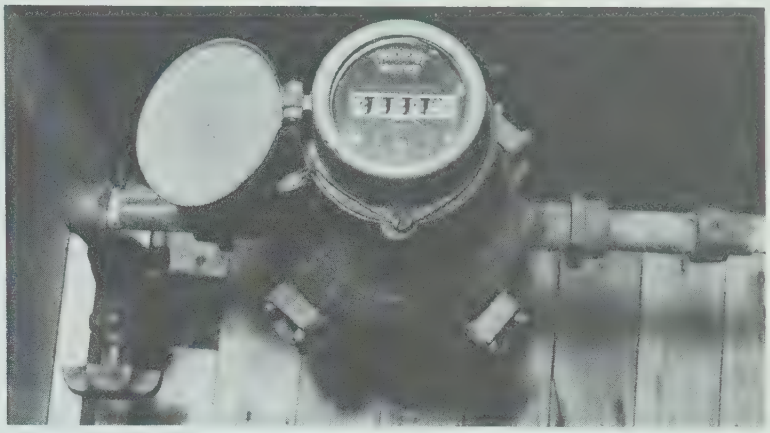
	Call: from Calgary to	Day	Time	Cost/ Minute	Minutes Talked	Regular Charge	Discount Rate	Discount Amount	Long Distance Charge
(a)	Edmonton	Monday	09:00	$0.30	6				
(b)	Lethbridge	Wednesday	22:00	$0.25	8				
(c)	Vancouver	Saturday	06:00	$0.50	4				
(d)	Regina	Sunday	14:00	$0.80	3				
(e)	Toronto	Tuesday	15:00	$1.60	3				
(f)	Winnipeg	Friday	05:00	$1.05	9				
(g)	Victoria	Monday	19:00	$0.55	12				
(h)	Saskatoon	Sunday	20:00	$0.75	17				

(i) What would this person's bill be if he had 2 contempra dial phones? (Add long distance to monthly charges.)

Math YOU Need

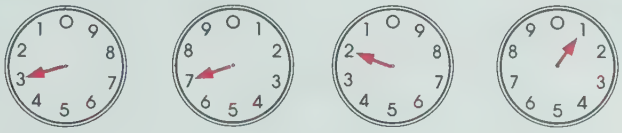
3. John made a call from Ottawa to Montréal on Sunday at 09:00. He received a 1/3 off discount. Was a mistake made?

3.11 Hydro Bills—Readings



Electric meters measure how much electricity a house or apartment uses. They record in units called "kilowatt hours"* (kW·h). 1 kW·h is 1000 W of electricity (or the power needed to burn a 100-W light bulb for 10 h).

Meters are read by looking at the four round dials inside the meter. For example, this meter reads 3721:



3 7 2 1

When the arrow is between numbers, the lower number is read.

1. Read these meters. Write the readings in your notebook.

(a) (b) (c)

2. Estimate, then find the electrical consumption for these families.

	Family	Meter Sept. 10	Meter Nov. 10	ESTIMATE Consumption (kW·h)	ACTUAL Consumption (kW·h)
(a)	Walmer	0273	1339	1300 − 300 = 1000 kW·h	1339 − 0273 = 1066 kW·h
(b)	Osgoode	6912	7533		
(c)	Terry	4367	4952		
(d)	Falmon	7777	9061		
(e)	Lapointe	5429	5971		
(f)	Wilson	6831	7348		
(g)	O'Reilly	8098	8681		
(h)	Thomas	7167	7943		
(i)	Kent	4312	5013		
(j)	Rae	2836	3463		

Note The kilowatt-hour is not a unit of the SI. It will be eventually replaced by the megajoule (one million joules). The joule is the SI unit of all forms of energy and work.

Math YOU Need

3. Estimate how much electricity the Kent family would use in a year. Use the information in question 2.

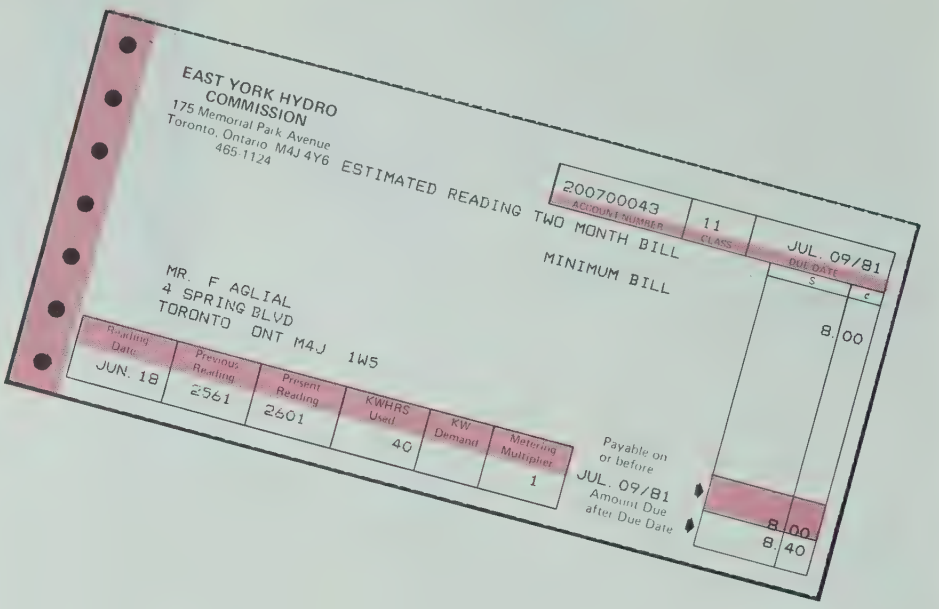
3.12 Hydro Bills—Charges

Hydro bills work on a simple principle: you pay for what you use.

(NOTE—The following charges are approximate—Hydro rates vary across the country.)

A hydro company charges the following for consumption:

6.8 ¢/kW·h for the first 100 kW·h
3.4 ¢/kW·h for the next 400 kW·h
2.4 ¢/kW·h for the remaining kilowatt hours.


EAST YORK HYDRO
COMMISSION
175 Memorial Park Avenue
Toronto, Ontario M4J 4Y6
465.1124

ESTIMATED READING TWO MONTH BILL
MINIMUM BILL

200700043 ACCOUNT NUMBER | 11 CLASS | JUL 09/81 DUE DATE

MR. F AGLIAL
4 SPRING BLVD
TORONTO ONT M4J 1W5

Reading Date	Previous Reading	Present Reading	KWHRS Used	KW Demand	Metering Multiplier
JUN. 18	2561	2601	40		1

$ ¢
8 00

Payable on or before JUL. 09/81
Amount Due after Due Date
8 00
8 40

For example, Maria and Kelly's consumption for two months was 756 kW·h. What did the hydro company charge them?

$$\begin{aligned} 756\ \text{kW·h} = \ & 100 \times 6.8¢ = \ 680¢ = \$\ 6.80 \\ & 400 \times 3.4¢ = 1360¢ = \$13.60 \\ & \underline{256} \times 2.4¢ = \ 614¢ = \$\ \underline{6.14} \\ & 756 \quad \text{Hydro charge} = \$26.54 \end{aligned}$$

1. Find the hydro charges for the families from the previous lesson.

	Family	Consumption kW·h	Hydro Charges
(a)	Walmer	1116 kW·h	(100 × 6.8¢) + (400 × 3.4¢) + (616 × 2.4¢)
(b)	Osgoode		= $35.18
(c)	Terry		
(d)	Falmon		
(e)	Lapointe		
(f)	Wilson		
(g)	O'Reilly		
(h)	Thomas		

2. Calculate what the hydro charges would be for these people.

	Name	Meter Jan. 10	Meter Mar. 10	Consumption (kW·h)	Hydro Charge
(a)	David Walker	1371	1946		
(b)	Jim Hudson	4698	4932		
(c)	Tony Demarco	3201	4131		
(d)	Fred Hail	8490	9263		
(e)	Helen Wright	4613	5281		
(f)	Peter Ross	7256	8003		
(g)	Tai Yeung	6132	7483		
(h)	Ray Louis	4855	5132		

(i) Whose hydro charge is the highest?
(j) What are some things the person in (i) could do to lower the hydro charge?

Math YOU Need

3. Jean has a freezer. It uses 63 kW·h of electricity per month. How much would it cost her to run the freezer for a year?

3.13 Budgeting—Monthly Costs

Most people work out their monthly costs to run a house or apartment. This helps them budget their money.

For example, Maria and Kelly decided to calculate their monthly costs. They included rent, telephone and hydro costs only (they have to have money for these each month). Their rent is $410 per month; telephone is $12.85 per month; hydro is $26.54 every 2 months. What are their monthly costs?

MONTHLY COSTS = RENT + TELEPHONE + (HYDRO ÷ 2)

Maria and Kelly's monthly costs = $410 + $12.85 + ($26.54 ÷ 2)
= $410 + $12.85 + $13.27
= $436.12

NOTE—The "Monthly costs" total will vary each month. Electricity consumption could rise or lower. There could be long distance calls. All calculations on this page then should be considered *estimates*.

1. Calculate the monthly costs for these families.

	Family	Rent	Telephone	Hydro (for 2 months)	Monthly costs
(a)	Gere	$375	$ 7.35	$24.04	$375 + $7.35 + ($24.04 ÷ 2)
(b)	Smith	$410	$11.35	$26.26	= $394.37
(c)	Brown	$355	$12.10	$28.24	
(d)	Chang	$620	$14.10	$24.66	
(e)	Geary	$515	$12.85	$33.04	
(f)	Lockhart	$495	$12.10	$26.02	
(g)	Stokes	$725	$14.85	$39.04	
(h)	Koszka	$815	$14.85	$41.80	
(i)	Burns	$973	$12.10	$32.86	
(j)	O'Malley	$524	$ 7.35	$22.86	

2. Calculate how much money each of the families in #1 has left after paying their monthly costs.

	Family	Monthly Income	Monthly Costs	Money left over after monthly costs
(a)	Gere	$ 795	$394.37	$795 − $394.37 = $400.63
(b)	Smith	$ 956		
(c)	Brown	$ 855		
(d)	Chang	$1049		
(e)	Geary	$1048		
(f)	Lockhart	$1015		
(g)	Stokes	$1275		
(h)	Koszka	$1250		
(i)	Burns	$1485		
(j)	O'Malley	$1175		

(k) What other monthly expenses will each family have?

Math YOU Need

3. The Brown family, in question 2, would like to buy a car. It would cost them $195.73/month. Can they afford the car?

3.14 Budgeting—30% Rule

Many people believe that you should only spend 30% of your income on housing. Spending more cuts down on your buying power.

For example, Maria and Kelly are trying to follow the 30% rule. Each girl makes $920 per month. They share the monthly costs equally. Their monthly costs are $436 (rounded to the nearest dollar). What percent of their monthly income is their monthly costs?

PERCENT OF MONTHLY INCOME = (MONTHLY COSTS ÷ TOTAL MONTHLY SALARY) × 100

Maria and Kelly's percent, monthly income = ($436 ÷ $1840) × 100
both girls' salaries combined
= 0.24 × 100
= 24% If percent is 30% or less, they follow the 30% rule.

1. Copy and complete this chart to find these families' percent monthly incomes (rounded to nearest percent).

	Family	Monthly Income	Monthly Costs	Percent, Monthly Income
(a)	Mahoney	$1215	$375	($375 ÷ $1215) × 100 = 31%
(b)	Mitchell	$1170	$342	
(c)	Gracey	$ 985	$252	
(d)	Black	$1321	$456	
(e)	Yumul	$1675	$501	
(f)	Fitzpatrick	$ 845	$217	
(g)	Yamamoto	$1576	$468	
(h)	Dahlia	$1931	$567	
(i)	Fuji	$2487	$851	
(j)	Rose	$1049	$378	

(k) Which families follow the 30% rule?
(l) Which families don't follow the 30% rule?

2. Samantha Kirk earns $17 500/a.
   (a) Calculate the yearly costs for each apartment below.
   (b) Calculate the percent, yearly income for each apartment.
   PERCENT OF YEARLY INCOME = (YEARLY COSTS ÷ TOTAL INCOME) × 100
   (c) Select the apartment that Samantha could best afford.

APARTMENT 1201	APARTMENT 1202	APARTMENT 1203
2-bedroom hydro incl. $550/month	2-bedroom hydro incl. $565/month	2-bedroom hydro not incl. $520 rent/month $15 hydro/month

Math YOU Need

3. The Rose family's rent went up $25. However, Mr. Rose got a 20% raise. Can they follow the 30% rule now? Use the information in question 1.

3.15 Think About It: To Buy Or To Rent

1. The house on the left sells for $51 000. Its monthly payment (mortgage and taxes) is $570 per month.

   The house on the right rents for $550 per month.
   (a) What will be the total monthly payments for house A over 1 a? over 5 a?
   (b) How much will it cost to rent house B for 1 a? for 5 a?
   (c) Rent on house B increases $10.00/a. How much will it cost to run house B for 5 a?
   (d) Which house do you feel gives the better deal?

2. Many people prefer to buy a house. They feel they are "owning" something, and can do what they want to it.

   Others would rather rent, either a house or an apartment. They don't want to be "tied" to one place, and enjoy the freedom of being able to move about.

   What do you feel is the best: buying or renting? In your notebook, list some advantages and disadvantages of each.

3. (a) Calculate the approximate costs of paying the mortgage and taxes on this house with a 25 a mortgage.

House Price	Mortgage Payment	Taxes	Monthly Payment (Mortgage + Taxes)	Yearly Payment
$55 000	$489 per month	$65 per month		
Cost of house after 25 a =				

   (b) What costs might rise over 25 a when buying a house?
   (c) Calculate the approximate cost of renting this house for 25 a.

House Rent	Yearly Rent	25-a Rent
$565 per month		

   (d) What costs might rise when renting a house?

3.16 Test-Run

UNIT 3 REVIEW TEST

Try this review test and find out what you have learned in Unit 3.

1. Calculate the hydro charges for these meter readings. Use the information under the chart.

	Meter Reading	Hydro Charge
(a)	360 kW·h	
(b)	297 kW·h	
(c)	1761 kW·h	
(d)	2832 kW·h	
(e)	983 kW·h	
(f)	7645 kW·h	

first 100 kW·h = 6.8¢/kW·h
next 400 kW·h = 3.4¢/kW·h
remaining kW·h = 2.4¢/kW·h

2. Terry lives in Toronto. She called her friend in Regina on Monday at 09:00. Did she get a discount?

3. Tony earns $1260 per month. His monthly costs are $485. Does he follow the 30% rule?

UNIT 4 PREVIEW TEST

You'll need these skills for Unit 4:
- multiplying decimal fractions
- changing percents to decimal fractions
- dividing decimal fractions

Try this test. How many can you do in your head?

1. Multiply.
   (a) $0.3 \times 0.7 =$
   (b) $0.6 \times 7 =$
   (c) $0.81 \times 0.3 =$
   (d) $1.1 \times 0.11 =$
   (e) $0.92 \times 2.02 =$
   (f) $1.83 \times 3.01 =$
   (g) $2.01 \times 0.88 =$
   (h) $6.11 \times 0.323 =$

2. Change these percents to decimal fractions.
   (a) 75%
   (b) 63%
   (c) 21%
   (d) 2%
   (e) 19.8%
   (f) 6.75%
   (g) 12.01%
   (h) 0.32%

3. Divide.
   (a) $6 \div 0.3 =$
   (b) $12 \div 0.4 =$
   (c) $19 \div 0.19 =$
   (d) $21 \div 0.07 =$
   (e) $0.63 \div 0.9 =$
   (f) $0.84 \div 1.2 =$
   (g) $0.96 \div 2 =$
   (h) $5.05 \div 0.05 =$

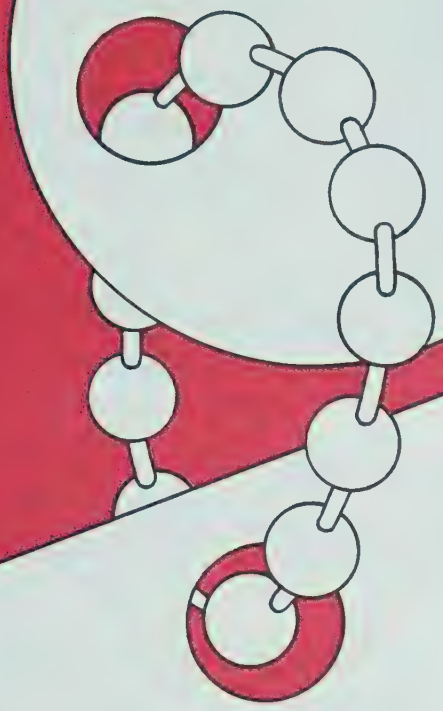
TAKE-A-BREAK: FRACTIONS TO %; FRACTIONS TO DECIMAL FRACTIONS

There is a 3-word message hidden in the answers to these questions. Use the code and be the first to unscramble the message.

90% = L	25% = !
75% = O	0.40 = H
0.5 = P	9% = U
20% = E	0.75 = M
0.8 = T	

$\frac{2}{5} =$. $\frac{1}{5} =$ % $\frac{9}{10} =$ % $\frac{3}{6} =$. $\frac{3}{4} =$.

$\frac{2}{10} =$ % $\frac{12}{16} =$ % $\frac{9}{100} =$ % $\frac{4}{5} =$. $\frac{1}{4} =$ %



UNIT 4
Running Your Own Place

Running a home takes a great deal of money. Math can help. This Unit shows how.

After you read this list of topics, try the Warm-ups. They'll get you ready to "run your own place".

4.1 Warm-up: Percent to Decimal Fraction
4.2 Warm-up: Operations With Decimal Fractions
4.3 Warm-up: Graphs
4.4 Buying vs. Renting
4.5 First Mortgages
4.6 Second Mortgages
4.7 Real Estate Commissions
4.8 Calculating Property Taxes
4.9 Tax Bills
4.10 Comparing Tax Rates
4.11 Oil Heating Costs
4.12 Heating Costs—Equal Billing
4.13 Monthly Housing Costs
4.14 Housing Budgets
4.15 Think About It: Running a House
4.16 Test Run: Unit 4 Review Test
Unit 5 Preview Test
Take-a-Break

4.1 Warm-up: Percent to Decimal Fraction

1. Convert these to decimal fractions.
   (a) 86% =
   (b) 92% =
   (c) 24% =
   (d) 4% =
   (e) 8% =
   (f) 112% =

2. Convert these to decimal fractions.
   (a) 7.6% =
   (b) 83.9% =
   (c) 67.8%
   (d) 0.32 % =
   (e) 0.09 % =
   (f) 2.013% =

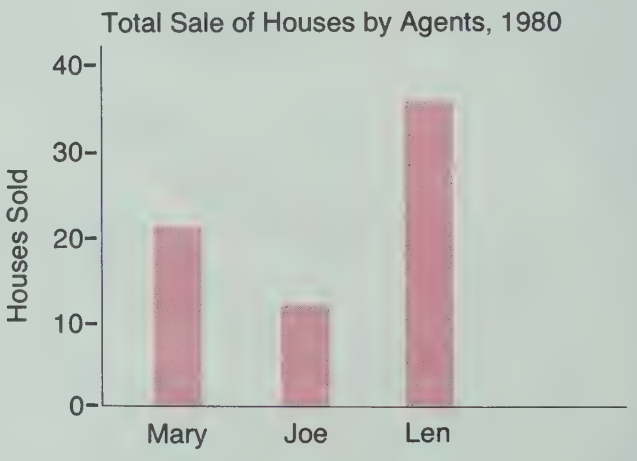
4.2 Warm-up: Operations With Decimal Fractions

1. Add.
   (a) 6.8 + 3.7 + 8.9 =
   (b) 2.21 + 8.345 =
   (c) 97.012 + 8.3945 =
   (d) 2.01 + 2.10 + 3 =
   (e) 8.05 + 0.31 + 0.87 =
   (f) 37.61315 + 9.125 =

2. Subtract.
   (a) 21.76 − 18.32 =
   (b) 19.84 − 18.76 =
   (c) 81.04 − 29.716 =
   (d) 0.198 − 0.045 =
   (e) 0.802 − 0.799 =
   (f) 1.838 − 1.7605 =

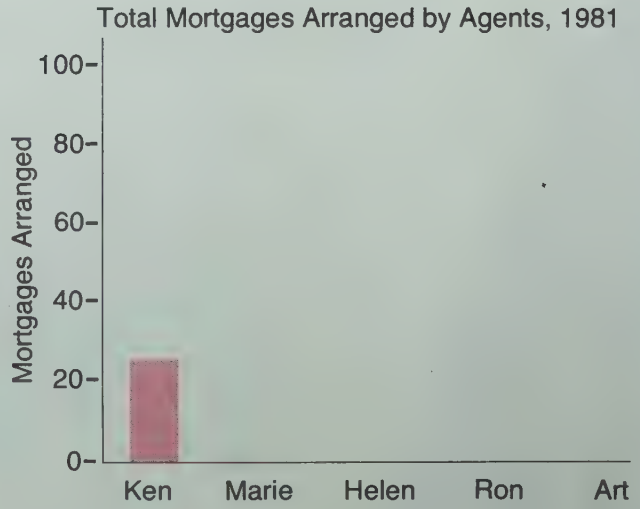
4.3 Warm-up: Graphs

1. Answer these questions about the graph on the right.
   (a) What is the title of this graph?
   (b) Who sold the most houses?
   (c) Who sold the least houses?
   (d) How many more houses did Mary sell than Joe?
   (e) About how many houses were sold altogether?
   (f) About what percent of the total sales is Len's portion?



2. Copy and complete the graph at the right. Use the information in the chart.

Total Mortgages Arranged by Agents, 1981	
Agent	**Mortgages Arranged**
Ken	25
Marie	37
Helen	84
Ron	19
Art	65



4.4 Buying vs. Renting

On the left is the Green family. Twenty-five years ago, they decided to rent their house

On the right is the Campbell family. Twenty-five years ago, they decided to buy their house.

Each family started out with $4000. The Greens invested their money in stocks. The Campbells used their money as the down payment and closing fees for their house.

Who had the better deal?

1. Copy and complete this financial statement for the Greens.

(a)

Money Paid Over 25 a		
Monthly Rent (average)		$250
No. months in house 12 × 25	=	_____
TOTAL RENT PAID	=	
ADD: initial stocks investment		$4000
TOTAL MONEY PAID	=	

(b)

Assets after 25 a		
25 a stock growth	= $30 492.32	
TOTAL ASSETS	=	_____

2. Copy and complete this financial statement for the Campbells.

(a)

Money Paid Over 25 a (House Cost = $22 500)		
Down Payment		= $4000
Mortgage Payment, 25 a	= $162 × 300	= _____
Taxes, 25 a	= $625 × 25	= _____
Repairs, 25 a	= $450 × 25	= _____
TOTAL PAID, 25 a		= _____

(b) Assets After 25 a
The house is now valued at $39 400, an increase of $16 900 over the original price.

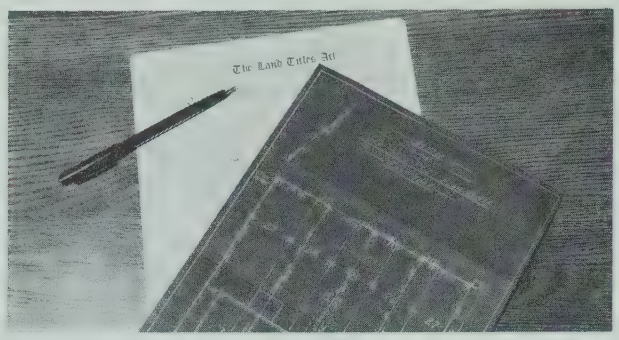
3. Since the Campbells own their house after 25 a, they have $39 400 invested. The Greens have a lesser amount.

Think carefully, then decide who you feel had the better deal. Give reasons for your choice.

Math YOU Need

4. The landlord decided to cancel the Greens' lease. Would they be better off renting another house, or using their savings to buy a house? Give a reason for your answer.

4.5 First Mortgages



People who buy houses usually have a special loan given to them called a *mortgage*. A mortgage is made up of principal (amount of the mortgage) and interest (cost of the mortgage, given as a percent).

Mortgages are called *first*, *second*, or *third* mortgage. The first mortgage is the largest, and so on.

First mortgages are usually 75% to 95% of the selling price of a house.

For example, Danny and Tina Wills wanted to buy a house, priced at $52 000. They had $5000 for a down payment. The mortgage company would give them a first mortgage that is 75% of the sale price. What would be the amount of the first mortgage?

FIRST MORTGAGE = HOUSE PRICE × PERCENT

Wills' first mortgage = $52 000 × 75%
= $52 000 × 0.75
= $39 000

1. Calculate the first mortgages for these houses at the varying percents.

	House Price	First Mortgage = 75%	First Mortgage = 85%	First Mortgage = 95%
(a)	$43 000	$43 000 × 0.75 = $32 250	$43 000 × 0.85 = $36 550	$43 000 × 0.95 = $40 850
(b)	$65 000			
(c)	$71 000			
(d)	$84 000			
(e)	$93 000			
(f)	$95 000			
(g)	$97 900			
(h)	$102 500			

2. Calculate how much the Wills would have to pay for a $39 000 mortgage at these interest rates:

(a)	10% (25-a amortization) 1 a = $348.65 × 12 = _____ 25 a = _____ × 25 = _____	10% (30-a amortization) 1 a = $336.45 × 12 = _____ 30 a = _____ × 30 = _____
(b)	$10\frac{1}{2}$% (25-a amortization) 1 a = $362.05 × 12 = _____ 25 a = _____ × 25 = _____	$10\frac{1}{2}$% (30-a amortization) 1 a = $350.28 × 12 = _____ 25 a = _____ × 25 = _____

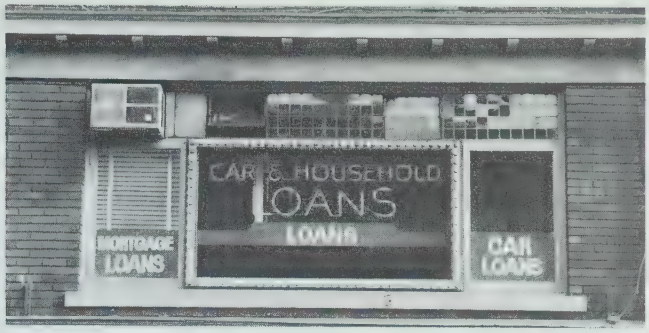
Note:
All payments listed include principal and interest.

(c) The Wills decided on the 25-a mortgage at 10%. How much did they save over the 30-a mortgage at the same rate?

Math YOU Need

3. The Wills have to pay $1175/a in property taxes. What is their total monthly principal, interest, and tax payment? Use the information in question 2(c).

4.6 Second Mortgages



Second mortgages are given to people whose down payment and first mortgage combined is still less than the house price. For example, the Wills had a $5000 down payment. Their first mortgage was $39 000. The house price was $52 000. What was the amount of their second mortgage?

SECOND MORTGAGE = HOUSE PRICE − (DOWN PAYMENT + FIRST MORTGAGE)

Wills' second mortgage = $52 000 − ($5000 + $39 000)
= $52 000 − $44 000
= $8000

1. Calculate the second mortgages for these families.

	Family	House Price	Down Payment	First Mortgage	Second Mortgage
(a)	Violet	$61 000	$7500	$48 800	$61 000 − ($7500 + $48 800) = $4700
(b)	Plum	$73 000	$7800	$58 400	
(c)	Cartwright	$84 500	$8300	$67 600	
(d)	Black	$87 900	$9000	$70 320	
(e)	Ching	$94 750	$10 000	$75 800	
(f)	Suzuki	$103 655	$15 000	$82 924	
(g)	Hay	$112 350	$15 000	$84 638	
(h)	White	$124 850	$18 000	$99 880	
(i)	Acker	$154 900	$30 000	$123 920	
(j)	Hanoski	$203 750	$33 000	$163 000	

2. The Wills were given some choices for payment of the $8000 second mortgage.

SECOND MORTGAGE: $8000 at 13%/a

Monthly Payment over 10 a	Monthly Payment over 15 a	Monthly Payment over 20 a
$117.86	$99.45	$91.81

Calculate the cost of repaying these mortgages, as shown below.

$8000 Second Mortgage, 13%/a

(a) 10-a amortization
1 a = $117.86 × 12
= _____
10 a = _____ × 10
= _____

(b) 15-a amortization
1 a = $99.45 × 12
= _____
15 a = _____ × 15
= _____

(c) 20-a amortization
1 a = $91.81 × 12
= _____
20 a = _____ × 20
= _____

(d) The Wills decided to take the 15-a second mortgage. What was their total monthly mortgage payment? (Check previous lesson for first mortgage payment.)

(e) Why is it better to have only a first mortgage on a house?

Math YOU Need

3. After 12 a, the Wills decided to sell their house for $65 950. They have paid $13 100 off their first mortgage and $4200 off their second mortgage. How much money will they have left after paying off the rest of their mortgages? Use the information in lessons 4.5 and 4.6.

4.7 Real Estate Commissions

Real estate agents are paid by commission when they sell property. Commissions are percentages of the selling price of the property.

For example, Mike Smith was the real estate agent who got the house for Danny and Tina Wills. He was paid a commission rate of 4% on the house price of $52 000. How much money did he earn?

COMMISSION = HOUSE PRICE × COMMISSION

Mike Smith's commission = $52 000 × 4%
= $52 000 × 0.04
= $2080

1. Calculate the commissions for these real estate agents.

	Agent	House Price	Commission Rate	Commission
(a)	Mary Orr	$65 000	5%	$65 000 × 0.05 = $3250
(b)	Helen Wright	$74 500	4%	
(c)	Tom Yeung	$90 000	3%	
(d)	Tai Ching	$37 850	4%	
(e)	Peter Ross	$86 200	5%	
(f)	Hal Blake	$78 300	2%	
(g)	Rose Clover	$97 350	5%	
(h)	Jerry Mann	$64 715	4.5%	
(i)	Joe East	$87 690	5.5%	
(j)	Marge Call	$63 760	2.25%	

2. Real estate agents usually share their commissions with their companies. For each sale, calculate
   - the agent's commission
   - the company's commission.

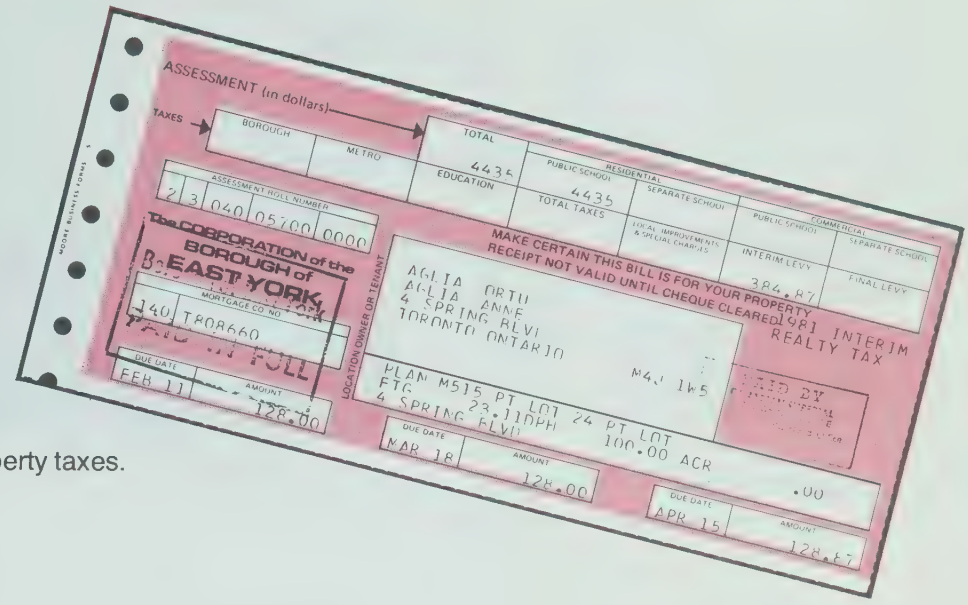
	Agent	House Price	Agent's Commission Rate	Agent's Commission	Company's Commission Rate	Company's Commission
(a)	Harry Sender	$76 000	4%	$76 000 × 0.04 = $3040	1%	$76 000 × 0.01 = $760
(b)	Laurie Kay	$83 000	3%		2%	
(c)	Rich Small	$91 500	5%		1%	
(d)	George Hunt	$79 600	2%		3%	
(e)	Mary Foulds	$84 450	3.5%		2.5%	
(f)	Marilyn Burns	$97 850	4.5%		1.5%	
(g)	Marie Seoul	$112 780	3.25%		2.75%	
(h)	Larry Hart	$121 300	5.25%		1.75%	

Math YOU Need

3. How could a real estate agent earn more commission?

4. Which of these sales would earn an agent the most money?
   (a) house price $89 500
   commission rate 4%
   (b) house price $110 650
   commission rate 3%
   (c) house price $75 900
   commission rate 6%

4.8 Calculating Property Taxes



Property is taxed (like many other things).

These taxes are calculated using two factors: *assessed value* and *mill rate*.

Assessed value = value of property depending on size, number of rooms, type of construction, etc. (This is *not* the property's selling price.)

Mill rate = the rate of the amount in dollars per $1000 of assessed value. This rate is used to calculate property taxes.

For example, in 1978, Hamilton, Ontario, had a mill rate of 148.7276. This means taxes are about $149 for each $1000 of assessment. City tax officials converted the mill rate to 0.1487276 when they calculated taxes. What would the yearly taxes be for a property assessed at $4250?

TAXES = ASSESSED VALUE × MILL RATE
= $4250 × 0.1487276
= $632.0923
= $632.09 rounded to the nearest cent

1. Calculate the taxes for these properties using Hamilton's 1978 mill rate.

	Assessed Value	Mill Rate	Taxes
(a)	$6000	148.7276	$6000 × 0.1487276 = $892.37
(b)	$3150	148.7276	
(c)	$9500	148.7276	
(d)	$7250	148.7276	
(e)	$9785	148.7276	
(f)	$10 400	148.7276	
(g)	$11 255	148.7276	
(h)	$8754	148.7276	
(i)	$6783	148.7276	
(j)	$14 728	148.7276	

2. Calculate the taxes for these properties in communities across Canada (based on $1000 assessments).

	Community	Assessed Value	Mill Rate	Taxes
(a)	Oshawa	$6905	87.650	$6905 × 0.087650 = $605.22
(b)	Toronto	$7200	203.05	
(c)	Halifax	$3655	16.467	
(d)	Regina	$6103	216.000	
(e)	Calgary	$8417	59.280	
(f)	Edmonton	$9138	17.710	

Math YOU Need

3. A property in Hamilton is assessed for $9700. The mill rate goes up 3.613 from 1978's mill rate. What are the taxes on this property? Use the information in question 1.

4.9 Tax Bills

Paying taxes on time saves money. Each tax bill shows an amount to be paid. If the amount is not paid by the due date, interest is charged on the amount due. This is called arrears.

For example Danny Wills must pay $127.00 by September 1. The arrears rate is 1% per month. How much will Danny owe if he is

(a) 1 month overdue?
(b) 2 months overdue?

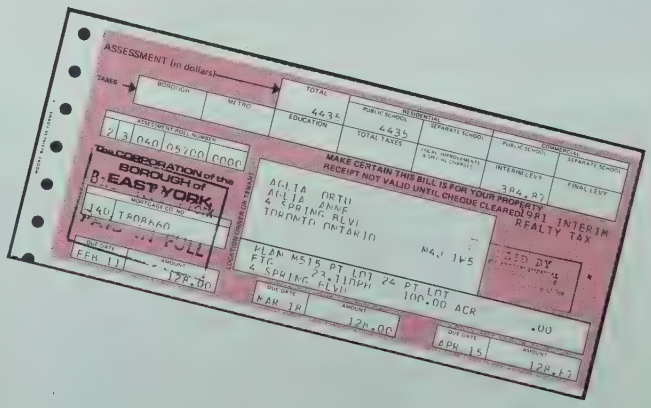
(a) ARREARS PAYMENT = AMOUNT DUE + (AMOUNT DUE × 1%)
Danny's arrears payment = $127.00 + ($127.00 × 0.01)
= $127.00 + $1.27
= $128.27

(b) ARREARS PAYMENT = AMOUNT DUE + (AMOUNT DUE × 1% × 2)
Danny's arrears payment = $127 + ($127 × 0.01 × 2)
= $127 + ($1.27 × 2)
= $127 + $2.54
= $129.54

1. Calculate the arrears payments for these families.

	Family	Amount Due	Time Overdue	Arrears Rate	Arrears Payment
(a)	Higher	$153.00	2 months	1%	$153 + (153 × 0.01 × 2) = $156.06
(b)	Blane	$165.00	1 month	1.25%	
(c)	Oswald	$172.00	3 months	1.5%	
(d)	Davis	$143.00	4 months	2%	
(e)	Cord	$192.00	3 months	1%	
(f)	Walker	$161.00	6 months	1.25%	
(g)	Ming	$183.50	1 month	2.5%	
(h)	Wold	$169.43	2 months	1.75%	
(i)	Fong	$178.21	8 months	1.5%	

2. Answer these questions about this tax bill.
   (a) What is the assessed value?
   (b) What is the amount due?
   (c) Calculate the arrears (1% per month) if the payment was
   - one month overdue
   - three months overdue
   - five months overdue.



Math YOU Need

3. The arrears rate in a town is 1.5% per month. Calculate the arrears payment for the following property: taxes = $852/a; payment is 3 months overdue.

4.10 Comparing Tax Rates

Property taxes help pay for the services in a community. This page shows how the taxes are divided up.

1. Mill rates are divided among the various parts of community government.
   (a) Study the table to see how Hamilton's total mill rates were divided from 1977 to 1980.
   (b) Did the total mill rate decrease in any of the years?
   (c) Between which two-year period was the greatest jump in the total mill rate?
   (d) Danny and Tina Wills' house was assessed at $4250. How much did they pay in each of the years for
   - secondary education
   - elementary education
   - city
   - region?

DESCRIPTION OF HAMILTON'S RESIDENTIAL MILL RATES

	1977	1978	1979	1980
City	44.67	44.17	48.50	50.44
Region	40.59	39.86	43.68	46.70
Total City and Region	85.26	84.03	92.18	97.14
Education — Elementary	31.28	34.42	39.85	40.95
— Secondary	27.26	30.28	33.43	33.77
Total Education	58.54	64.70	73.28	74.72
Total Mill Rates	143.80	148.73	165.46	171.86

2. These questions refer to the table of Vancouver's mill rates, 1975-1979.
   (a) In what years did the total mill rate increase?
   (b) In what years did the total mill rate decrease?
   (c) The Browns' property was assessed at $5145. How much would they have to pay in each of the years for:
   - education
   - general
   - hospital and other?

Vancouver Mill Rate Table

Year	General	Schools	Hospitals and Other
1975	17.280	37.158	2.945
1976	19.000	43.270	3.264
1977	19.791	46.329	3.731
1978	44.395	48.649	4.286
1979	44.020	46.794	4.142

3. These questions refer to the table of Halifax's mill rates, 1977-1981. (Halifax bases its mill rates on $100 assessment instead of $1000 assessments.)
   (a) In what years did the residential mill rate increase?
   (b) In what years did the commercial mill rate decrease?
   (c) The Whites' property was assessed at $3489. How much residential tax would they have to pay for each of the years?
   (d) The Whites own a grocery store assessed at $17 641. What was their business occupancy tax in 1980? in 1981?

Halifax Mill Rate Table

Year	Residential (Total Rate)	Commercial (Total Rate)	Business Occupancy (Total Rate)
1977	2.8635	7.369	7.239
1978	1.859	5.88	5.776
1979	1.991	6.1623	6.0773
1980	2.073	6.1985	6.0865
1981	1.6467	3.9119	3.8239

Math YOU Need

4. Do you agree or disagree with this statement: Mill rates never go down? Give a reason for your answer.

4.11 Oil Heating Costs

Many Canadians heat their homes with oil instead of natural gas or electricity.

In one community, oil sells for 33.6¢/L. An oil delivery man delivered oil to the Wills' house. His truck meter read 8320 L before delivery, and 7348 L after delivery. How much was the cost of oil for the Wills?

COST OF OIL = ("BEFORE" METER READING − "AFTER" METER READING) × COST/LITRE

Wills' cost of oil = (8320 L − 7348 L) × 33.6¢/L
= 972 L × 33.6¢/L
= 32659¢
= $326.59

1. Calculate the cost of oil delivered for these families (rounded to the nearest cent).

	Family	Before Meter Reading	After Meter Reading	Amount of Oil Delivered	Cost/ Litre	Cost of Oil Delivered
(a)	Jones	7348 L	6050 L	7348 L − 6050 L	34.9¢	1298 L × 34.9¢
(b)	Bell	5067 L	3972 L	= 1298 L	34.9¢	= $453.00
(c)	Osaka	4813 L	4179 L		34.9¢	
(d)	Hill	6213 L	5691 L		34.9¢	
(e)	Gordon	9317 L	8581 L		34.9¢	
(f)	Noble	10 467 L	9781 L		34.9¢	
(g)	Slade	6134 L	5268 L		34.9¢	
(h)	Breen	8379 L	7498 L		34.9¢	
(i)	Patrick	7614 L	7284 L		34.9¢	
(j)	MacDonald	9171 L	8318 L		34.9 ¢	

2. Complete this cost sheet for oil deliveries to the Wills' house.

	Date of Delivery	Before Meter Reading	After Meter Reading	Amount of Oil Delivered	Cost/ Litre	Cost of Oil Delivered
(a)	Nov. 3	8716 L	8290 L		36.9¢	
(b)	Dec. 4	9483 L	9041 L		36.9¢	
(c)	Jan. 6	7683 L	6973 L		36.9¢	
(d)	Feb. 1	8813 L	8163 L		36.9¢	
(e)	Mar. 4	6417 L	5938 L		36.9¢	

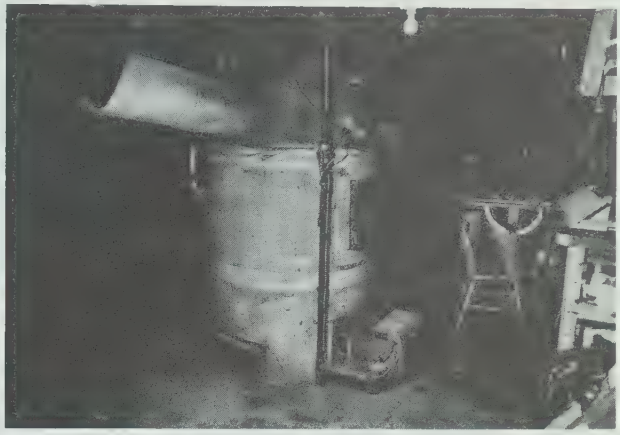
3. Estimate, then find the average monthly cost of oil delivered to these families.

	Family	Amount of Oil Delivered in Year	Cost/ Litre	Cost of Oil Delivered	ESTIMATE, Average Monthly Cost	ACTUAL, Average Monthly Cost
(a)	Brown	3158 L	36.9¢			
(b)	Page	4822 L	36.9¢			
(c)	White	3486 L	36.9¢			
(d)	Calvin	5591 L	36.9¢			
(e)	Thomas	4328 L	36.9¢			
(f)	Kent	3872 L	36.9¢			

Math YOU Need

4. The White family, in question 3, added more insulation to their house. It cut their heating costs by 23%/a. What would their new yearly heating costs be?

4.12 Heating Costs—Equal Billing



"Equal billing" is a plan many people use. They pay the same amount each month for their heating costs.

For example, the Wills decided to use the equal billing plan. Their oil heating costs last year totalled $628.75. What will their equal billing payments be?

EQUAL BILLING PAYMENTS = (PREVIOUS YEAR'S TOTAL HEATING COST ÷ 12 MONTHS) + $10.00*

Wills' equal billing payments = ($628.75 ÷ 12) + $10.00
= $52.40 + $10.00
= $62.40 per month

*Heating companies add about $10.00 to the monthly payment. This allows for increases in heating costs over the year.

1. Calculate the equal billing payments for these families who heat with oil (rounded to the nearest dollar).

	Family	Previous Year's Total Heating Cost	Equal Billing Payment (per month)
(a)	Arnold	$723.76	($723.76 ÷ 12) + $10 = $70.31
(b)	Carole	$841.92	
(c)	Deade	$326.84	
(d)	Gray	$516.79	
(e)	Hill	$923.81	
(f)	Portnum	$1 071.42	
(g)	Lamply	$685.00	
(h)	Able	$1 262.00	

2. Calculate the equal billing payments for these families who heat with natural gas (rounded to the nearest dollar).

	Family	Previous Year's Total Heating Cost	Equal Billing Payments (per month)
(a)	Jones	$351.75	
(b)	David	$487.63	
(c)	Lamoureux	$258.31	
(d)	Miguel	$329.47	
(e)	Lorche	$561.45	
(f)	Saluski	$433.21	

3. Estimate, then calculate the equal billing payments for these families who heat with natural gas (rounded to the nearest dollar).

	Family	Previous Year's Total Heating Cost	ESTIMATE, Equal Billing Payments (per month)	ACTUAL, Equal Billing Payments (per month)
(a)	Hay	$786.49		
(b)	Field	$891.38		
(c)	Sharon	$647.67		
(d)	Wright	$781.83		
(e)	Omen	$1 241.63		
(f)	Franklin	$1 578.79		

Math YOU Need

4. The Hay family, in question 3, had to pay $60 more at the end of their equal-billing year. Should the gas company raise their monthly payment $5/month? $10/month? $15/month?

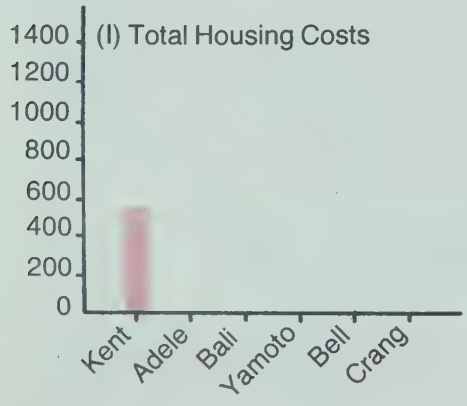
4.13 Monthly Housing Costs

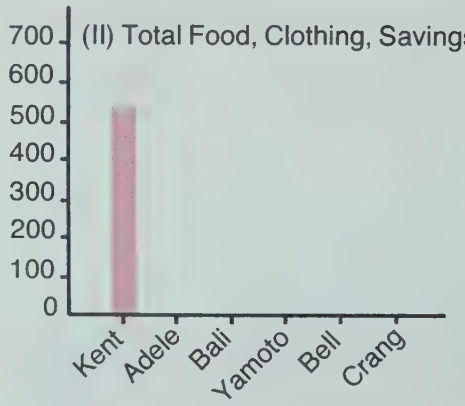
Many people calculate their monthly costs. This helps them to budget their earnings.

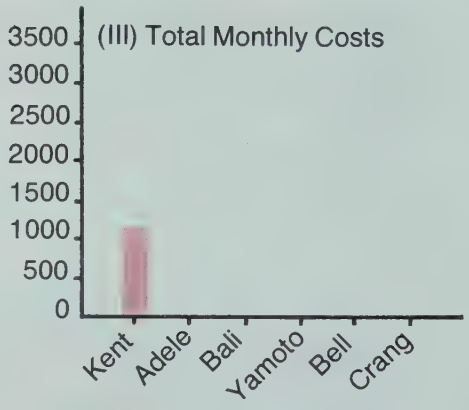
1. Calculate the total monthly costs for these families.

	(a)	(b)	(c)	(d)	(e)	(f)
Family Item	**Kent**	**Adele**	**Bali**	**Yamoto**	**Bell**	**Crang**
first mortgage	$318.96	$217.84	$529.41	$713.21	$698.00	$117.00
second mortgage	$ 97.45	—	$ 64.33	$ 24.73	$ 43.17	—
taxes	$ 78.37	$ 64.37	$ 89.27	$ 97.33	$ 56.27	$ 37.00
oil	$ 50.00	$ 43.00	$ 65.00	$ 61.00	$ 55.00	$ 33.00
hydro	$ 17.00	$ 15.00	$ 21.00	$ 24.00	$ 18.00	$ 12.00
telephone	$ 12.85	$ 7.35	$ 11.35	$ 14.85	$ 11.35	$ 7.35
TOTAL HOUSING	$574.63					
food	$280.00	$240.00	$320.00	$200.00	$320.00	$120.00
clothing	$100.00	$ 73.00	$210.00	$450.00	$100.00	$ 25.00
savings	$150.00	$320.00	$ 95.00	$230.00	$200.00	$827.00
TOTAL FOOD, CLOTHING, SAVINGS	$530.00					
TOTAL MONTHLY COSTS	$1104.63					

Complete these bar graphs in your notebook for the above families.







2. Calculate the total monthly costs for these families.

	(a)	(b)	(c)	(d)	(e)	(f)
Family Item	**Cord**	**Bray**	**Collin**	**Dieppe**	**Marks**	**Spencer**
rent	$485.00	$510.00	$685.00	$390.00	$890.00	$235.00
hydro	$ 18.00	$ 21.75	$ 36.50	$ 17.25	$ 33.00	$ 14.00
telephone	$ 11.85	$ 12.85	$ 7.35	$ 7.35	$ 11.35	$ 7.35
TOTAL HOUSING						
food	$320.00	$280.00	$240.00	$180.00	$360.00	$160.00
clothing	$250.00	$310.00	$210.00	$150.00	$480.00	$ 40.00
savings	$325.00	$480.00	$685.00	$280.00	$1125.00	$1381.00
TOTAL FOOD, CLOTHING, SAVINGS						
TOTAL MONTHLY COSTS						

Math YOU Need

3. Food costs rose 18% last year. How much more will the Bray family, in question 2, have to pay for food? What will be their new monthly food cost?

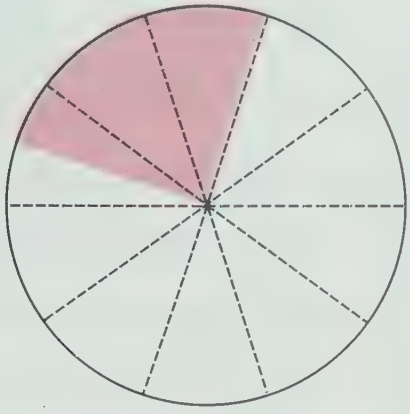
4.14 Housing Budgets

It's a good idea for families to keep budgets. This shows them how their money is spent.

For example, the Kent family earns about $1200 a month. They spend about $300 a month on food. What percent of their monthly earnings is their food bill?

PERCENT OF MONTHLY EARNING = (FOOD BILL ÷ MONTHLY EARNINGS) × 100
= ($300 ÷ $1200) × 100
= 0.25 × 100
= 25%

This percent can be shown on a circle graph. A circle is drawn and divided evenly into 10 parts (10 parts × 10% = 100 parts or 100%).

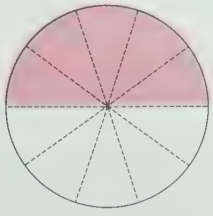


1. (a) Calculate the Shale's percents of their monthly income for the items given.

Item	Amount/Month	Monthly Income	Percent, Monthly Income
housing	$600	$1200	($600 ÷ $1200) × 100 = 50%
food	$200	$1200	
clothing	$100	$1200	
savings	$200	$1200	

(b) Copy and complete this circle graph for the Shale's.

50% = housing
_____ = food
_____ = clothing
_____ = savings
_____ = TOTAL PERCENT SHOWING

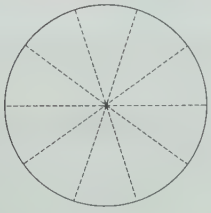


2. (a) Calculate the Owen's percents of their monthly income for the items given.

Item	Amount/Month	Monthly Income	Percent, Monthly Income
housing	$600	$1600	
food	$400	$1600	
clothing	$200	$1600	
savings	$200	$1600	

(b) Copy and complete this circle graph for the Owen's.

_____ = housing
_____ = food
_____ = clothing
_____ = savings
_____ = TOTAL PERCENT SHOWING



Math YOU Need

3. The Shale family, in question 1, wants to buy a new car. Monthly payments for the car would be $187.57.
   (a) Can they afford the monthly payments?
   (b) Should they buy the car? Give a reason for your answer.

4.15 Think About It: Running a House

Owning and running a house involves much time and money. Many people have sold their houses just to get rid of the "headaches". Owning a house can be one person's dream and another's horror.

1. The Clarks bought a house 5 a ago. Complete this cost sheet for items used to run the house (does not include mortgage, taxes, hydro or telephone).

	Item	Cost/Item	When Bought	TOTAL COST OF ITEM
(a)	lawnmower	$149.50	once	
(b)	outdoor paint	$ 10.95	every 5 a	
(c)	indoor paint	$ 14.95	every year	
(d)	asphalt	$375.00	once	
(e)	patio stones	$485.00	once	
(f)	shrubbery	$625.00	once	
(g)	flowers	$ 25.00	every year	
(h)	wallpaper	$ 65.00	every year	
(i)	rake	$ 5.00	once	
(j)	shovel	$ 5.00	once	
(k)	fencing	$815.00	once	
(l)	tool shed	$215.00	once	
(m)	general repairs	$ 45.00	every year	
(n)	TOTAL COST FOR 5 a _____			

(o) Which item cost the most?
(p) Which item cost the least?
(q) What other costs might there be in running a house?

2. Estimate, then calculate the running costs over 5 a of the Whites' house.

	Item	Cost/Item	When Bought	ESTIMATE, Total Cost	ACTUAL, Total Cost
(a)	lawnmover	$ 86.50	once		
(b)	outdoor paint	$ 5.50	every year		
(c)	indoor paint	$ 10.75	every year		
(d)	asphalt	$195.00	once		
(e)	patio stones	$ 35.00	once		
(f)	shrubbery	$145.00	once		
(g)	flowers	$ 15.00	every year		
(h)	wallpaper	$ 3.00	every year		
(i)	rake	$ 3.00	once		
(j)	shovel	$ 3.00	once		
(k)	fencing	$148.00	once		
(l)	tool shed	$ 96.89	once		
(m)	general repairs	$123.00	every year		
(n)	TOTAL COST FOR 5 a _____				

3. Give your opinion: is it better to own a house, or to rent a place (house, apartment, etc.)?

4.16 Test Run

UNIT 4 REVIEW TEST

Now, see what you've learned in Unit 4.

1. Calculate the first mortgage amount for these houses.

	House Price	First Mortgage 75%	First Mortgage 90%
(a)	$ 88 000		
(b)	$ 64 050		
(c)	$ 75 950		
(d)	$110 380		
(e)	$297 790		

2. The Hays bought a house for $89 953. They had $11 200 as a down payment. Their first mortgage was set at 75% of the house price. How much was their second mortgage?

3. Calculate these property taxes.

	Assessed Value	Mill Rate	Taxes
(a)	$ 6 700	145.735	
(b)	$ 8 230	145.735	
(c)	$ 4 500	145.735	
(d)	$ 9 870	145.735	
(e)	$10 640	145.735	

UNIT 5 PREVIEW TEST

You'll need these skills for Unit 5:
- Changing percents to decimal fractions and common fractions
- changing percents to a number
- multiplying decimal fractions

Try to do these in less than 20 min.

1. Change to decimal fractions.
   (a) 76%
   (b) 82%
   (c) 33%
   (d) 19%
   (e) 1%
   (f) 100%

2. Change to common fractions.
   (a) 38%
   (b) 29%
   (c) 64%
   (d) 2%
   (e) 18%
   (f) 200%

3. Calculate.
   (a) 17% of 30
   (b) 21% of 2
   (c) 19.8% of 69
   (d) 3% of 486
   (e) 91% of 72
   (f) 43.87% of 6

4. Multiply.
   (a) 3.7 × 8.93
   (b) 6.91 × 0.82
   (c) 0.33 × 0.303
   (d) 72.6 × 1.31
   (e) 9.84 × 2.1
   (f) 0.816 × 0.81

TAKE-A-BREAK: % OF A NUMBER

Q. What does a boy get when he's been tanning too long?

CODE

O = 7	N = 2
B = 8	R = 9
S = 1	U = 6

A. Find the percents of these numbers. The numbers that appear in the boxes signal the answer. Use the code to get the message.

17% of 83 = _____ _____ □ _____
33% of 22 = □ _____ _____
45% of 16 = _____ □
9% of 21 = _____ □ _____
12% of 64 = _____ □ _____
91% of 32 = _____ □ _____ _____
84% of 29 = □ _____ _____ _____

UNIT 5
Spending Money

People like to spend money. This unit will show you some ways to spend it wisely.

Try the Warm-ups after you read over this list of topics.

5.1 Warm-up: Changing Percents to Decimal and Common Fractions
5.2 Warm-up: Percent of a Number
5.3 Warm-up: Changing Decimal Fractions to Percents
5.4 Warm-up: Multiplying Decimal Fractions
5.5 A Weekly Budget
5.6 Family Budgets
5.7 Calculating Savings
5.8 Calculating Discounts
5.9 Calculating Sale Price
5.10 Checking Claims in Ads-Groceries
5.11 Checking Claims: in Ads-Clothing
5.12 Think About It: Getting the Best Deal
5.13 Test Run: Unit Review Test
Unit 6 Preview Test
Take-a-Break

5.1 Warm-Up: Changing Percents to Decimal and Common Fractions

1. Change these percents to decimal fractions.
   (a) 61% =
   (b) 82% =
   (c) 93% =
   (d) 24% =
   (e) 45% =
   (f) 84% =
   (g) 12% =
   (h) 3% =
   (i) 9% =
   (j) 1% =

2. Change these percents to common fractions.
   (a) 68% =
   (b) 74% =
   (c) 75% =
   (d) 91% =
   (e) 58% =
   (f) 12.5% =
   (g) 33.3% =
   (h) 25% =
   (i) 5% =
   (j) 50% =

5.2 Warm-Up: Percent of a Number

1. Find:
   (a) 6% of 8 =
   (b) 9% of 12 =
   (c) 17% of 3 =
   (d) 41% of 6 =
   (e) 19% of 21 =
   (f) 7% of 14 people =
   (g) 12% of 50 nails =
   (h) 14% of 75 apples
   (i) 64% of 87 trees
   (j) 91% of 1241 cookies =

2. Find:
   (a) 61% of 3.9 =
   (b) 18.7% of 6 =
   (c) 21% of 84 =
   (d) 19.32% of 8.7 =
   (e) 9.13% of 21.6 =
   (f) 4% of 4 =
   (g) 5% of 0.25 =
   (h) 67.7% of 67 =
   (i) 9% of 0.919 =
   (j) 84% of 100 =

5.3 Warm-Up: Decimal Fractions to Percents

There are 7 mistakes in exercises 1 and 2. Find them and write the correct answers in your notebook.

1.
   (a) 0.15 = 15%
   (b) 0.50 = 50%
   (c) 0.55 = 55%
   (d) 0.09 = 9%
   (e) 1.5 = 15%
   (f) 2.5 = 25%
   (g) 6.9 = 0.69%
   (h) 0.125 = 12.5%
   (i) 1.25 = 125%
   (j) 12.5 = 1250%

2.
   (a) 0.75 = 7.5%
   (b) 1.25 = 125%
   (c) 2.5 = 2.5%
   (d) 0.90 = 90%
   (e) 1.75 = 175%
   (f) 2.5 = 250%
   (g) 0.2 = 2%
   (h) 0.25 = 25%
   (i) 0.91 = 91%
   (j) 100 = 100%

5.4 Warm-Up: Multiplying Decimal Fractions

Multiply.

1.
   (a) $\begin{array}{r} 6.8 \\ \times\ 1.3 \end{array}$
   (b) $\begin{array}{r} 4.7 \\ \times\ 8.9 \end{array}$
   (c) $\begin{array}{r} 0.31 \\ \times\ 1.8 \end{array}$
   (d) $\begin{array}{r} 7.64 \\ \times\ 0.81 \end{array}$
   (e) $\begin{array}{r} 0.132 \\ \times\ 0.13 \end{array}$
   (f) $\begin{array}{r} 0.876 \\ \times\ 1.6 \end{array}$
   (g) $\begin{array}{r} 0.109 \\ \times\ 2.3 \end{array}$
   (h) $\begin{array}{r} 6.81 \\ \times\ 0.34 \end{array}$

2.
   (a) 6.81 × 0.13 =
   (b) 9.761 × 0.013 =
   (c) 8.48 × 0.121 =
   (d) 0.6145 × 0.81 =
   (e) 0.014 × 0.083 =
   (f) 4.891 × 6.817 =
   (g) 7.86 × 8.3 =
   (h) 1.219 × 0.814 =
   (i) 7.816 × 0.143 =
   (j) 0.1448 × 0.0181 =

5.5 A Weekly Budget

A budget is a plan for spending money. Using a budget will help you know how much money you have for each budgeted item.

For example, Susan has an allowance of $10.00 a week. She allows for $1.75 a week to be spent on transportation. What percent of her $10.00 is the $1.75 spent on transportation?

PERCENT OF TOTAL = (AMOUNT OF ITEM ÷ TOTAL MONEY) × 100

Transportation percent of total = ($1.75 ÷ $10.00) × 100
= 0.175 × 100
= 17.5%

1. Calculate the percents for these weekly budgets.

	John gets $10.00 a week		
	Item	Amount/Week	Percent
(a)	transportation	$1.20	($1.20 ÷ $10.00) × 100 = 12%
(b)	lunch money	$3.50	
(c)	pinball	$1.50	
(d)	movie	$2.50	
(e)	TOTAL	$8.70	
(f)	Left over for savings	$10.00 − $8.70 =	100% − 87% =

	Jean gets $15.00 a week		
	Item	Amount/Week	Percent
(g)	transportation	$1.50	
(h)	lunch money	$1.65	
(i)	weekly game	$1.75	
(j)	movie	$2.50	
(k)	TOTAL		
(l)	Left over for savings		

	Allan gets $18.00 a week		
	Item	Amount/Week	Percent
(m)	transportation	$1.50	
(n)	lunch money	$4.25	
(o)	books	$3.75	
(p)	entertainment	$5.50	
(q)	TOTAL		
(r)	Left over for savings		

	Ray earns $24.00 a week		
	Item	Amount/Week	Percent
(s)	transportation	$3.75	
(t)	lunch money	$3.25	
(u)	clothing	$4.50	
(v)	movie	$2.50	
(w)	TOTAL		
(x)	Left over for savings		

2. Calculate the budget amounts for the following people.

	Thomas Hays earns $35.00 a week		
	Item	Percent	Amount per Week
(a)	transportation	25% of $35.00	$35.00 × 0.25 = $8.75
(b)	food	12% of $35.00	
(c)	clothing	18% of $35.00	
(d)	entertainment	19% of $35.00	
(e)	other expenses	12% of $35.00	
(f)	savings	14% of $35.00	

	Sharon earns $127.00 a week		
	Item	Percent	Amount per Week
(g)	transportation	15%	
(h)	food	25%	
(i)	clothing	10%	
(j)	entertainment	30%	
(k)	savings	20%	

Math YOU Need

3. Allan's transportation costs went up to $2.00 per week. What percent of his $18.00 will he now have left over for savings:
(a) 1%? (b) 13.8% (c) 0%?
Use the information in question 1.

5.6 Family Budgets

Family budgets usually have different items than personal budgets.

For example, the Blaines have a monthly take-home pay of $935.00. They budget 30% of this amount for their monthly mortgage payment. What is their mortgage payment?

MONTHLY MORTGAGE PAYMENT = BUDGET PERCENT OF TAKE-HOME PAY

Blaine's monthly mortgage payment = 30% of $935.00
= 0.30 × 935
= $280.50

1. Calculate these monthly budgeted amounts of the Walter family (to the nearest cent).

	Walter family — $935.00 monthly income		
	Item	**Percent**	**Amounts per Month**
(a)	mortgage	31%	31% of $935 = 0.31 × $935 = $289.85
(b)	transportation	5%	
(c)	food	20%	
(d)	clothing	10%	
(e)	medical	2%	
(f)	insurance	1%	
(g)	entertainment	9%	
(h)	debt payments	18%	
(i)	savings	4%	
(j)	TOTAL		

(k) Which item takes up the greatest amount of money?
(l) Which item takes up the smallest amount of money?
(m) How much money will the Walters save in a year?

2. Estimate, then calculate these monthly and yearly budgeted amounts for the Acres family.

	Acres family — $1215.00 monthly income					
	Item	**Percent**	**ESTIMATE Monthly Amount**	**ESTIMATE Yearly Amount**	**ACTUAL Monthly Amount**	**ACTUAL Yearly Amount**
(a)	mortgage	29%	0.3 × 1200 = $360	$360 × 12 = $4320	0.29 × 1215 = $352.35	$352.35 × 12 = $4228.20
(b)	transportation	18%				
(c)	food	21%				
(d)	clothing	13%				
(e)	medical	3%				
(f)	insurance	2%				
(g)	entertainment	8%				
(h)	debt payment	4%				
(i)	savings	2%				
(j)	TOTAL					

Math YOU Need

3. The Acres family, in question 2, plan to spend $500 on a vacation next year. Which item should they take money from to help save the $500? Give a reason for your answer.

5.7 Calculating Savings

Smart shoppers save money by buying "on sale" items.

For example, Fay Ward bought a pair of jeans on sale for $14.95. The regular price for the jeans was $19.95. How much did Fay save?

SAVINGS = REGULAR PRICE − SALE PRICE

Fay's savings = $19.95 − $14.95
= $5.00

1. Calculate the savings for each of these items.

	Item	Regular Price	Sale Price	Savings
(a)	socks	$2.98	$1.49	$2.98 − $1.49 = $1.49
(b)	shirt	$7.99	$5.39	
(c)	hat	$12.57	$8.77	
(d)	gloves	$14.38	$12.28	
(e)	shoes	$54.99	$23.54	

	Item	Regular Price	Sale Price	Savings
(f)	toothbrush	$1.69	$0.49	
(g)	kettle	$14.30	$8.87	
(h)	coat	$148.76	$98.30	
(i)	fan	$54.98	$37.95	
(j)	car	$8761.79	$6549.80	

2. Calculate the savings for each of these entertainment items.

(a) **RADIO!**
REG. $87.95
SALE $63.50

(b) **T.V. COLOUR!**
REG. $849.75
SALE $699.95

(c) **PROJECTOR**
REG. $349.95
SALE $289.95

(d) **CAMERA! SLR**
REG. $289.75
SALE $148.35

(e) **TAPE RECORDER**
REG. $548.75
SALE $329.65

(f) **TURNTABLE**
REG. $189.95
SALE $118.98

(g) **AMPLIFIER**
REG. $688.77
SALE $432.89

(h) **SPEAKERS!**
REG. $649.99/pr.
SALE $387.88/pr.

(i) What is the total savings for all the items?

Math YOU Need

3. Dave wanted to buy an amplifier, a set of speakers and a turntable for his room. Should he
   (a) buy a used sound system for $1000? or
   (b) buy the items from the sale in question 2?

5.8 Calculating Discounts

Stores often use "percent off" signs to advertise a sale.

You can use this information to find out how much money you actually save.

For example, John wanted to buy a record which regularly sells for $7.98. It was on sale at 10% off. What was the discount?

DISCOUNT = REGULAR PRICE × PERCENT OFF

Discount on record = $7.98 × 10%
= $7.98 × 0.10
= $0.80 ← rounded to the nearest cent

1. Calculate the discounts for these items (rounded to the nearest cent).

	Item	Regular Price	Percent Off	Discount
(a)	boat	$6481.78	20%	$6481.78 × 20% = $1296.36
(b)	tent	$249.88	15%	
(c)	camper	$2481.99	35%	
(d)	stove	$487.88	50%	
(e)	humidifier	$158.77	24%	
(f)	refrigerator	$789.49	32%	
(g)	air conditioner	$321.55	10%	
(h)	heater	$164.85	18%	
(i)	van	$9750.00	25%	
(j)	radio	$329.47	85%	

2. Calculate the discounts for these clothing items (rounded to the nearest cent).

(a) BLOUSE!
15% OFF
REG. $21.98

(b) SWEATER!
18% OFF
REG. $34.95

(c) PANTS!
25% OFF
REG. $18.78

(d) SHIRT!
55% OFF
REG. $11.99

(e) HAT!
28% OFF
REG. $12.98

(f) COAT!
22% OFF
REG. $58.50

(g) BOOTS!
53% OFF
REG. $67.88/pr.

(h) CAPE!
30% OFF
REG. $89.77

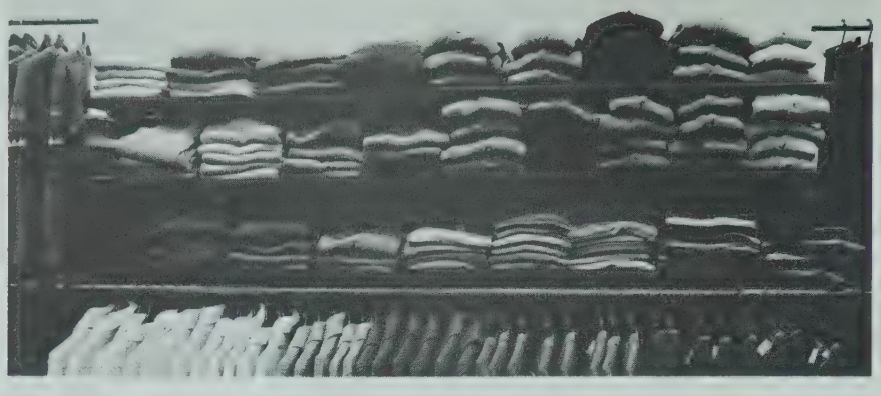
3. Complete this cost sheet for the furniture department of a large store.

May Sale 20% OFF all items				May Sale 20% OFF all items		
	Item	Regular Price	Discount to Customer	Item	Regular Price	Discount to Customer
(a)	corner cabinet	$109.99	$22.00	(e) bar stool	$ 22.50	
(b)	table	$ 99.98		(f) captain's chair	$ 69.89	
(c)	side chair	$ 49.98		(g) night table	$ 35.89	
(d)	4-drawer chest	$ 65.89		(h) 5-drawer chest	$ 79.89	

Math YOU Need

4. John has $100 to spend on clothes. Can he buy 4 shirts and 4 pairs of pants from the sale in question 2?

5.9 Calculating Sale Price



Many stores advertise a sale, without giving the sale price.

For example, Helen bought a sweater on sale at 10% off. The regular price of the sweater was $24.95. What was the sale price of the sweater?

SALE PRICE = REGULAR PRICE − DISCOUNT

Sweater's sale price = $24.95 − ($24.95 × 10%)
= $24.95 − $2.50 ← rounded to the nearest cent
= $22.45

1. Find the sale price of each of these items.

	Item	Regular Price	Percent Off	Discount	Sale Price
(a)	chair	$197.50	20%	$39.50	$197.50 − $39.50 = $158.00
(b)	pool	$486.54	40%		
(c)	model car	$12.87	60%		
(d)	piano	$2478.39	50%		
(e)	roller skates	$56.49	25%		
(f)	hockey stick	$11.49	34%		
(g)	can of paint	$12.95	55%		
(h)	book	$14.95	80%		
(i)	bicycle	$139.95	22%		
(j)	wagon	$24.97	17%		

2. Find the sale price of each of these car items.

(a) **MAGS!**
25% OFF
REG. $44.95 ea.

(b) **MUFFLER!**
30% OFF
REG. $55.90

(c) **RADIAL TIRES!**
45% OFF
REG. $69.95 ea.

(d) **RADIO!**
60% OFF
REG. $89.85

(e) **8-TRACK!**
75% OFF
REG. $129.35

(f) **DECALS!**
24% OFF
REG. $14.95 set

(g) **SEAT COVERS!**
48% OFF
REG. $75.90 set

(h) **FLOOR MATS!**
52% OFF
REG. $34.95 set

3.

ED'S RECORDS
"Take Me" by the Suspenders
REG. $7.98
NOW 15% off!

O'TOOLE'S RECORDS
"Take Me" by the Suspenders
REG. $8.98
NOW 20% off!

(a) Find the sale price of "Take Me" for each record store.
(b) Which store gives the better deal? By how much does it give a better deal?

Math YOU Need

4. True or false: "If an item has a large discount, it was a poor seller at regular price."
Give a reason for your answer.

5.10 Checking Claims in Ads—Groceries

Many people check the claims in grocery ads. This tells them if they really are getting a good "deal".

For example, Jean read that 5 kg of potatoes was on sale at 1/3 off. The regular price was $1.89. The sale price was $1.39. Was this the correct sale price?

$$\text{CHECKING CLAIM} = \text{REGULAR PRICE} - \text{DISCOUNT}$$
$$= \$1.89 - \left(\frac{1}{3} \text{ of } \$1.89\right)$$
$$= \$1.89 - \left(\frac{1}{3} \times \$1.89\right)$$
$$= \$1.89 - \left(\frac{1}{3} \times \frac{1.89}{1}\right)$$
$$= \$1.89 - \frac{1.89}{3}$$
$$= \$1.89 - \$0.63$$
$$= \$1.26$$

$1.39 was not the correct sale price.
$1.26 was the correct sale price.

1. Check these grocery claims (to the nearest cent).

	Item	Regular Price	Sale Price	CHECK: Discount	CHECK: Sale Price	Is Sale Price Correct?	Correct Sale Price
(a)	ham $\frac{1}{4}$ off	$4.89/kg	$3.77/kg	$\frac{1}{4} \times \$4.89 = \$1.22$	$\$4.89 - \$1.22 = \$3.67$	No	$3.67
(b)	turkey 20% off	$3.49/kg	$2.79/kg				
(c)	roast 32% off	$5.25/kg	$3.57/kg				
(d)	turnip $\frac{1}{3}$ off	$0.99 ea.	$0.68 ea.				
(e)	pineapple $\frac{1}{2}$ off	$0.89 ea.	$0.48 ea.				
(f)	milk 40% off	$0.78/L	$0.47/L				
(g)	cookies 8% off	$1.19 ea.	$1.09 ea.				
(h)	cereal 11% off	$1.14 ea.	$1.09 ea.				

2. Check the claims in these grocery ads.

(a) **TEA BAGS**
REG. $2.05
SALE $1.89
Save 4%

(b) **ORANGE JUICE**
REG. $1.03
SALE $0.89
Save 13%

(c) **SOUP**
REG. $0.71
SALE $0.67
Save 5%

(d) **POTATOES 1/3 off!**
REG. $1.79/kg
SALE 1.39/kg

(e) **MARMALADE**
Save 10%
REG. $0.99
SALE $0.90

(f) **TUNA 1/4 off!**
REG. $1.89
SALE $1.49

Math YOU Need

3. Marie has $75 to spend on groceries. Could she buy all of the items in questions 1 and 2?

5.11 Checking Claims in Ads—Clothes

Clothing can be expensive. It's a good idea to check claims made in clothing ads.

For example, Jan saw a hooded sweatshirt on sale at 33% off. The regular price was $14.95. The sale price was $10.25. Was this the correct sale price?

CHECKING CLAIM = REGULAR PRICE − DISCOUNT
= $14.95 − (33% of $14.95)
= $14.95 − (33% × $14.95)
= $14.95 − (0.33 × $14.95)
= $14.95 − $4.93
= $10.02

$10.25 was not the correct sale price.
$10.02 was the correct sale price.

1. Check these clothing claims (rounded to the nearest cent).

	Item	Regular Price	Sale Price	CHECK: Discount	CHECK: Sale Price	Is Sale Price Correct?	Correct Sale Price
(a)	bracelet 20% off	$ 32.00	$ 26.98	$32.00 × 20% = $6.40	$32.00 − $6.40 = $25.60	No	$25.60
(b)	shirt 30% off	$ 12.95	$ 9.06				
(c)	skirt $\frac{1}{3}$ off	$ 24.99	$ 16.99				
(d)	blouse 25% off	$ 17.95	$ 13.45				
(e)	pants 18% off	$ 22.99	$ 18.99				
(f)	hat 20% off	$ 18.97	$ 15.18				
(g)	coat 50% off	$248.55	$124.99				
(h)	gloves 10% off	$ 3.49	$ 3.14				
(i)	socks $\frac{1}{5}$ off	$ 1.89	$ 1.50				
(j)	pyjamas $\frac{1}{4}$ off	$ 12.95	$ 9.80				

2. Check the claims in the clothing ad for Arnold's Discount Clothing Boutique.

EVERYTHING MUST GO!!
CLOSING OUT SALE!!
CHECK OUT THESE BARGAINS!

(a) **Car coats! 20% off!**
Reg. $99.00 ea.
Now $79.20 ea.

(b) **Shawl! 80% off!**
Reg. $44.95
Now $10.99

(c) **Boots! 1/4 off!**
Reg. $89.95
Now $68.99

(d) **Hats! 30% off!**
Reg. $24.99 ea.
Now $17.49 ea.

(e) **Sports Coats! 40% off.**
Reg. $79.65 ea.
Now $49.90 ea.

(f) **Suits! 60% off!**
Reg. $338.47 ea.
Now $150.00 ea.

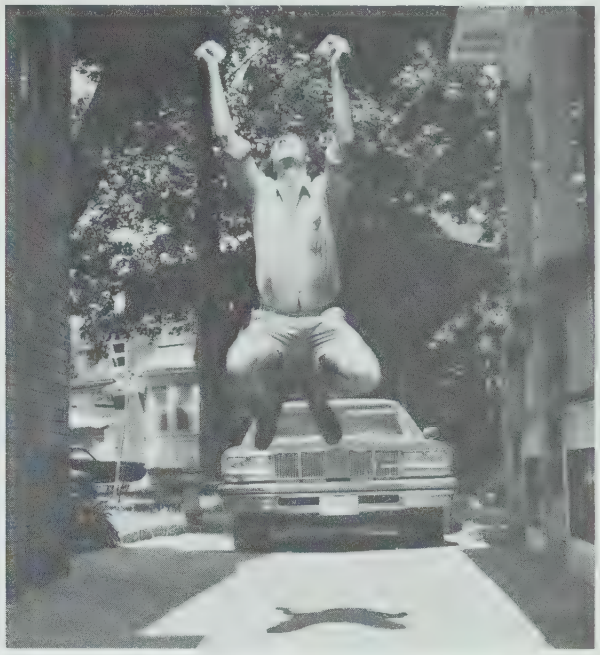
(g) **Pantsuit Outfits! 1/6 off!**
Reg. $32.99 ea.
Now $29.39 ea.

(h) **Skirts! 75% off!**
Reg. $24.95 ea.
Now $7.25 ea.

Math YOU Need

3. Bill has $300 to spend on clothes. If he shops at Arnold's, could he buy a suit, 2 pairs of boots and 5 hats?

5.12 Think About It: Getting the Best Deal



On this page, you'll get a chance to spend some money.

You have $16 000. You will spend it on
- furniture
- clothing
- a car.

Look for the best deals. Keep a record of your purchases. At the end of question 3 you must have at least $3000 left over. (This is for your Hawaiian vacation!)

1. Buy a sofa, table and chairs set, and a bed from the following sale items.

ED'S FURNITURE

SALE!!!		
Sofas	**Table and 4 chairs**	**Beds!**
Reg. $789	Reg. $1199	Reg. $289
NOW 30% off!	NOW 23% off!	NOW 16% off!

HALE'S FURNITURE MART

Sofas	**Tables and 3 chairs**	**Beds!**
Reg. $659	Reg. $917	Reg. $359
NOW 18% off!	NOW 10% off!	NOW 28% off!

2. Buy 3 suits from the following sale items.

Rene's Clothing Goods
SUITS
Reg. $295
NOW $210

Louis' Neat Duds
SUITS ON SALE!
Reg. $325
NOW 35% OFF

3. Buy a car from the following sale items.

Bargain Buck's Buicks
ALL CARS MUST GO
Buick Le Sabre
Reg. $8950
NOW 20% OFF!

Nowltan's Buick Town
SALE!
Buick Le Sabre
Reg. $9565
NOW $8000!

Ted Bolton Buick
SALE on Le Sabres!
Reg. $8775
NOW 18% OFF!

4. Now calculate how much money you have spent. Do you have $3000 left over?

5.13 Test Run

UNIT 5 REVIEW TEST

Try this test to see what you've learned in Unit 5.

1. Calculate the sale price for each of these items.

	Item	Regular Price	Percent Off	Discount	Sale Price
(a)	cassette deck	$269.95	30%		
(b)	TV converter	$149.95	25%		
(c)	headphones	$ 56.95	20%		
(d)	turntable	$145.80	20%		
(e)	sound system	$698.75	15%		
(f)	selected albums	$8.99 ea.	10%		
(g)	magnetic cartridge	$ 69.55	23%		
(h)	reel-to-reel deck	$817.50	34%		

2. A TV was $679, regular price. John bought it at a "1/4 off" sale for $545. Was he overcharged?

3. Helen saves $15 every week. Could she buy a $765 motorcycle after saving for a year?

UNIT 6 PREVIEW TEST

You'll need these skills for Unit 6:
- adding and subtracting whole numbers
- multiplying whole numbers and decimal fractions
- finding the percent of a number

Try this test. Estimate how long it will take you to finish.

1. (a) 324 + 68 =
   (b) 57 + 325 =
   (c) 69 + 84 =
   (d) 2 + 13 + 138 =
   (e) 48 − 37 =
   (f) 79 − 46 =
   (g) 23 − 18 =
   (h) 92 − 83 =

2. (a) $3.29 × 5 =
   (b) $6.06 × 9 =
   (c) $31.13 × 3 =
   (d) 2.4 × 12 =
   (e) 3.87 × 17 =
   (f) 0.21 × 38 =
   (g) 0.109 × 15 =
   (h) 276 × 0.18 =

3. (a) 30% of 16 =
   (b) 21% of 21 =
   (c) 19% of 87 =
   (d) 16% of 45 =
   (e) 2% of 7.8 =
   (f) 9% of 0.12 =
   (g) 36% of 71 =
   (h) 0.5% of 84 =

TAKE-A-BREAK: ADDING DECIMAL NUMBERS

Check to find if these are magic squares.

(a)

9.0	9.5	9.4
9.7	9.3	8.9
9.2	9.1	9.6

(b)

12.25	13.5	13.25
14.0	13.0	12.0
12.75	12.5	13.75

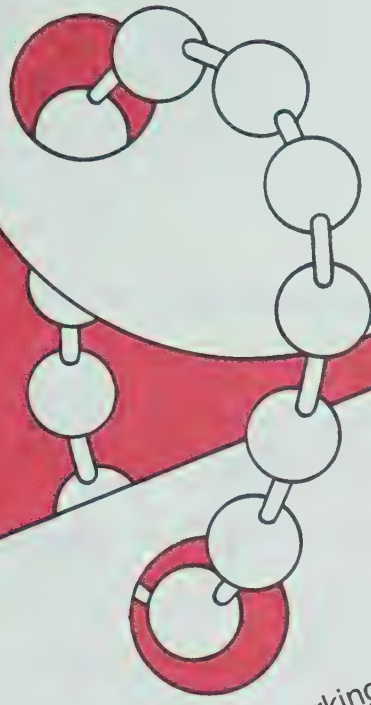
(c)

84.9	49.8	89.4
8.49	89.4	9.48
9.48	98.4	48.9

Add the columns horizontally, vertically and diagonally in a magic square. The answers must be the same in each case. For example,

2	7	6	15
9	5	1	15
4	3	8	15
15	15	15	

UNIT 6
Earning Money



One of the good things about working at a job is getting paid for it. This unit shows how math will help you when you're "earning money"!

6.1 Warm-up: Addition, Subtraction of Whole Numbers
6.2 Warm-up: Addition, Subtraction of Decimal Fractions
6.3 Warm-up: Multiplication of Decimal Fractions, Whole Numbers
Hours Worked
6.4 Wages
6.5 Overtime Pay
6.6 Weekly Earnings (Gross)
6.7 Commissions
6.8 Commission Earnings
6.9 Salary Plus Commission
6.10 CPP Deductions
6.11 UIC Deductions
6.12 Income Tax Deductions
6.13 Total Deductions
6.14 Think About it: Insurance Sales Commissions
6.15 Test-Run: Unit 6 Review Test
Unit 7 Preview Test
Take-a-Break

Try Warm-ups 6.1, 6.2 and 6.3. They'll get you ready to "earn money"!

6.1 Warm-up: Addition, Subtraction of Whole Numbers

1. Add.
   (a) 64 + 99 + 87 + 36 =
   (b) 22 + 22 + 23 + 24 =
   (c) 187 + 961 + 640 =
   (d) 809 + 908 + 123 =
   (e) 4871 + 6286 + 3798 =
   (f) 24 764 + 36 700 + 87 010 =

2. Subtract.
   (a) 64 − 32 =
   (b) 87 − 69 =
   (c) 241 − 203 =
   (d) 697 − 548 =
   (e) 2076 − 1325 =
   (f) 9001 − 8998 =

6.2 Warm-up: Addition, Subtraction of Decimal Fractions

1. Add.
   (a) 6.89 + 1.2 + 3.14 =
   (b) 2.08 + 97.6 + 0.12 =
   (c) 0.14 + 0.89 + 0.128 =
   (d) 1.32 + 8.09 + 9.114 =
   (e) 27.64 + 6.08 + 0.124 =
   (f) 9.011 + 1.009 + 0.36 =

2. Subtract.
   (a) 84.79 − 61.66 =
   (b) 21.301 − 6.178 =
   (c) 14.08 − 6.012 =
   (d) 99.089 − 1.2134 =
   (e) 8.14 − 6.0086 =
   (f) 2.832 − 0.3176 =

6.3 Warm-up: Multiplication of Decimal Fractions, Whole Numbers

1. Multiply.
   (a) 6.3 × 21 =
   (b) 82 × 3.7 =
   (c) 0.19 × 18 =
   (d) 13.7 × 16 =
   (e) 8.34 × 72 =
   (f) 9.01 × 86 =

2. Multiply.

(a) 6.4 × 36	(b) 0.21 × 89	(c) 3.81 × 47	(d) 0.896 × 72
(e) 47 × 0.63	(f) 671 × 0.32	(g) 8076 × 1.9	(h) 5374 × 0.14

6.4 Hours Worked

There are many ways of finding out how many hours an employee works.
One way is using a time clock.
For example, Jim Child works at Al's Garage. On Monday, he started work at 07:00 and finished at 17:00. He had 1 h off for lunch. How many hours did Jim work?

HOURS WORKED = (FINISHING TIME − STARTING TIME) − LUNCH TIME
= (17:00 − 07:00) − 1 h
= 10 h − 1 h
= 9 h worked

1. Complete these time record sheets for employees at Al's Garage.

	NAME: Cheryl Dale					
	Day	**Time Started**	**Time Finished**	**Hours on Card**	**Lunch Time**	**Hours Worked**
(a)	Monday	07:00	15:00	8 h	1 h	7 h
(b)	Tuesday	07:00	15:00		1 h	
(c)	Wednesday	07:00	16:00		1 h	
(d)	Thursday	07:00	17:00		1 h	
(e)	Friday	O F F				
(f)	Saturday	08:00	14:30		1 h	
(g)	Total Hours Worked					

	NAME: Rob Blarken					
	Day	**Time Started**	**Time Finished**	**Hours on Card**	**Lunch Time**	**Hours Worked**
(h)	Monday	08:00	16:00		1 h	
(i)	Tuesday	07:00	17:00		½ h	
(j)	Wednesday	07:00	17:00		1 h	
(k)	Thursday	O F F				
(l)	Friday	08:00	17:00		½ h	
(m)	Saturday	08:00	16:00		½ h	
(n)	Total Hours Worked					

2. The Artistic Welding Co. uses a time clock to keep a record of when employees start work and finish work. Complete this time sheet for one day's work.

	EMPLOYEE TIME SHEET, MONDAY NOV. 14					
	Name	**Time Punched In**	**Time Punched Out**	**Hours on Card**	**Lunch Time**	**Hours Worked**
(a)	Hal Blaine	06:00	14:00		1 h	
(b)	Art Reve	08:00	15:00		1 h	
(c)	Cal Gormley	08:00	17:00		½ h	
(d)	Peter Whibbs	09:00	18:00		1 h	
(e)	George Brown	07:00	18:00		½ h	

(f) Calculate how many hours each employee will work in a 5-d work week.

Math YOU Need

3. Cheryl Dale's time card showed 49 h one week. How many hours should she be paid for overtime work (work done after 40 h)?

6.5 Wages

One benefit of working is getting paid. For example, Josie Wade works at Sheila's Clothing Boutique. She earns $4.10/h. She works 40 h a week. What is her weekly gross pay?

GROSS PAY = HOURS WORKED × HOURLY RATE
= 40 h × $4.10
= $164.00 ← gross pay, before any deductions are taken off

1. Calculate the weekly gross pay for each of these employees.

	ALL-LAND MOVERS EMPLOYEE PAY SHEET, MAY 16 - 23			
	Name	**Hourly Rate**	**Hours Worked**	**Gross Pay**
(a)	Jim Elcott	$ 8.75	35	$8.75 × 35 = $306.25
(b)	Ray King	$ 8.75	37	
(c)	Link Bond	$ 7.50	40	
(d)	Art Athol	$ 9.10	40	
(e)	Red Simcoe	$10.40	40	
(f)	Rose Walter	$ 9.80	40	
(g)	Bill Woune	$11.20	38	
(h)	Diane Droll	$ 6.55	35	

2. Find the gross weekly pay for these two employees of Mary's Million Dollar Donuts.

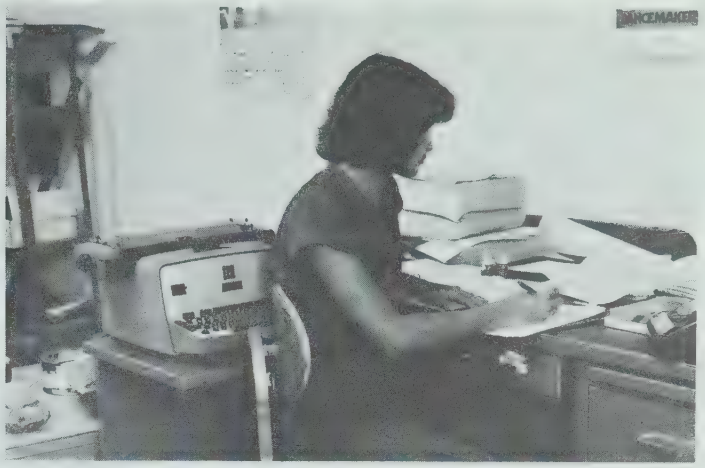
	Kay Helen Hourly Rate = $3.65					
	Day	**Time In**	**Time Out**	**Hours on Card**	**Lunch Time**	**Hours Worked**
(a)	Monday	08:00	16:00		1 h	
(b)	Tuesday	O F F				
(c)	Wednesday	08:00	16:00		1 h	
(d)	Thursday	07:00	15:00		1 h	
(e)	Friday	07:30	15:30		1 h	
(f)	Saturday	O F F				
(g)	Sunday	08:00	18:00		1 h	
(h)	Total Hours Worked					
(i)	Gross Pay					

	Roger Dayton Hourly Rate = $4.15					
	Day	**Time In**	**Time Out**	**Hours On Card**	**Lunch Time**	**Hours Worked**
(j)	Monday	14:00	22:00		1 h	
(k)	Tuesday	14:00	22:00			
(l)	Wednesday	O F F				
(m)	Thursday	O F F				
(n)	Friday	08:00	16:00		1 h	
(o)	Saturday	08:00	16:00		1 h	
(p)	Sunday	08:00	17:00		1 h	
(q)	Total Hours Worked					
(r)	Gross Pay					

Math YOU Need

3. Approximately, what would Kay's gross pay be for 1 a, if she gets 2 weeks vacation? Use the information in question 2.

6.6 Overtime Pay



A regular work week is usually 40 h.
Any time worked after this is called *overtime*.

Overtime rates vary. The usual rate is *time and one half*.
For Sundays or public holidays, the usual rate is *double time*.

For example, Hill earns \$8.50/h. What is his
(a) regular overtime pay?
(b) holiday overtime pay?

(a) REGULAR OVERTIME PAY = HOURLY PAY × OVERTIME RATE

$$= \$8.50/\text{h} \times 1\frac{1}{2}$$

$$= \$8.50 \times \frac{3}{2}$$

$$= \frac{\$25.50}{2}$$

$$= \$12.75/\text{h}$$

(b) HOLIDAY OVERTIME PAY = HOURLY PAY × OVERTIME RATE

$$= \$8.50/\text{h} \times 2$$

$$= \$17.00/\text{h}$$

1. Calculate what the hourly overtime pay will be for these people (rounded to the nearest cent).

	Name	Hourly Pay	Overtime Rate	Hourly Overtime Pay
(a)	Jim	\$5.65	$1\frac{1}{2}$	$\$5.65 \times 1\frac{1}{2} = \$8.48$
(b)	Al	\$6.50	$1\frac{1}{2}$	
(c)	Peter	\$6.90	2	
(d)	George	\$7.45	$1\frac{1}{2}$	
(e)	Larry	\$7.65	2	
(f)	Henry	\$8.15	2	

2. Calculate how much overtime pay these people will earn.

	Name	Hourly Pay	Overtime Rate	Hourly Overtime Pay	Hours of Overtime Worked	Total Overtime Pay
(a)	Pat	\$6.75	$1\frac{1}{2}$	$\$6.75 \times 1\frac{1}{2} = \$10.13$	4	$\$10.13 \times 4 = \$40.52$
(b)	Helen	\$6.35	$1\frac{1}{2}$		3	
(c)	Kay	\$5.28	$1\frac{1}{2}$		2	
(d)	Fay	\$7.15	2		5	
(e)	Sybil	\$8.25	2		1	
(f)	Marie	\$9.00	2		4	

Math YOU Need

3. Pat got a raise to \$7.15/h. How much would she earn in overtime if she worked 7 h overtime at time and one half? Use the information in question 2.

4. Al, in question 1, worked 48 h. His gross pay was \$318. Did the payroll department make a mistake?

6.7 Gross Weekly Earnings

You'll rarely get to keep everything you earn!
There are actually two earnings: gross earnings and net earnings.
Gross earnings: money earned before deductions.
Net earnings: money given to the employee *after* deductions.

For example, Bill South earns a regular pay of $195.00 a week. In one week, he earned an extra $47.50 in overtime. What were his gross weekly earnings for that week?

GROSS WEEKLY EARNINGS = REGULAR PAY + OVERTIME PAY
= $195.00 + $47.50
= $242.50

1. Calculate the gross weekly earnings for these people.

	Name	Regular Pay	Overtime Pay	Gross Weekly Earnings
(a)	Ina	$189.95	$17.50	$189.95 + $17.50 = $207.45
(b)	Leroy	$206.70	$21.89	
(c)	Cathy	$175.35	$14.90	
(d)	Tom	$169.40	$43.21	

	Name	Regular Pay	Overtime Pay	Gross Weekly Earnings
(f)	Bob	$198.89	$18.21	
(g)	Sally	$219.21	$26.25	
(h)	Gretchen	$237.40	$37.35	
(i)	Hans	$138.64	$25.85	
(j)	Maha	$185.40	$31.80	

2. Complete this wage sheet for employees of Friendly Fern's Flower Shoppe.

	WEEKLY EARNINGS SHEET: WEEK OF MAY 12 - MAY 19								
	Name	Hourly Pay	Regular Hours Worked	Regular Pay	Overtime Rate	Hourly Overtime Pay	Hours of Overtime	Overtime Pay	Gross Weekly Earnings
(a)	Jill	$3.10	40		$1\frac{1}{2}$		8		
(b)	Kevin	$3.85	40		$1\frac{1}{2}$		7		
(c)	Ethel	$4.15	40		$1\frac{1}{2}$		5		
(d)	Mary	$4.25	35		$1\frac{1}{2}$		0		
(e)	Janet	$4.85	40		$1\frac{1}{2}$		3		
(f)	Margo	$5.15	35		$1\frac{1}{2}$		0		
(g)	Will	$5.35	40		$1\frac{1}{2}$		2		
(h)	Tom	$6.25	40		$1\frac{1}{2}$		9		

(i) Which employee earned the most during the week?

Math YOU Need

3. Friendly Fern's Flower Shoppe, in question 2, had sales totalling $1295 for that week. Was this enough to cover the employees' payroll?

6.8 Commissions

Many sales people are paid by commission instead of regular weekly earnings. Commission is a percentage of the sale price of an item.

For example, Ken Arnold is a salesperson in a large furniture store. He is paid a commission of 25% of the selling price for every piece of furniture he sells. What is his commission earned if he sells a sofa for $789?

COMMISSION EARNED = SALE PRICE × RATE OF COMMISSION
= $789 × 25%
= $789 × 0.25
= $197.25

1. Calculate the commissions earned by these sales people on these items.

	Sales Person	Item	Selling Price	Commission Rate	Commission Earned
(a)	Betty Pearl	table	$189.90	4%	$189.90 × 4% = $7.60
(b)	Ying Ho	chair	$117.89	5%	
(c)	Peter Bridle	T.V.	$549.95	5.5%	
(d)	Bob Smith	stereo	$786.40	6%	
(e)	Hep Brown	sofa	$861.86	6.8%	
(f)	Carl Won	bed	$142.45	7.9%	
(g)	Stacey Quen	bed suite	$1248.98	10%	
(h)	Jane Suzuki	end table	$69.95	10.4%	
(i)	Al Green	table	$87.85	12%	
(j)	Joe Able	sofa	$648.37	12.8%	

2. Calculate the commissions these car sales people will earn.

	Sales Person	Car	Selling Price	Commission Rate	Commission Earned
(a)	Joe Wheel	Lemans	$9489	8%	
(b)	Cal Hubble	Parissiene	$12 496	7.5%	
(c)	Marie Lapointe	Malibu	$7831	9.5%	
(d)	Harry Horn	Monza	$8481	9.5%	
(e)	Harold Arbre	Delta 88	$9128	7.8%	
(f)	Shirley Temp	Cutlass	$4321	9%	
(g)	Jenny Jones	Volaré	$5586	12.3%	
(h)	Al Orord	Citation	$9178	6%	
(i)	Neil Stokes	Phoenix	$6849	5.4%	
(j)	Sean O'Neill	Sebring	$7684	8%	

(k) Who earned the most commission?
(l) Who earned the least commission?
(m) If these cars were all sold in one week, how much total commission would the car dealer have to pay?

Math YOU Need

3. Jenny, in question 2, sold 4 cars for a total of $22 785 one week. Did she earn enough commission to buy a $2750 Yamaha motorcycle?

6.9 Commission Earnings

12% 15% 3% 10% 2.5% 5% 25%

This page gives you practice in calculating commission earnings.

1. Calculate Tim Short's weekly commission earnings by completing this sales sheet.

	Day	Item Sold	Price	Commission Rate	Commission Earned
(a)	Monday	fridge	$889.95	5%	$889.95 × 5% = $44.50
(b)		stove	$489.60	5%	
(c)	Tuesday	stove	$529.35	5%	
(d)		humidifier	$139.35	3%	
(e)	Wednesday	dryer	$265.80	3%	
(f)		washer	$329.40	3%	
(g)	Thursday	washer	$418.45	3%	
(h)		fridge	$719.95	5%	
(i)	Friday	stove	$581.65	5%	
(j)	TOTAL COMMISSION EARNED FOR WEEK				

2. Calculate the weekly earnings for these car sales people.

	Sales Person	Cars Sold in Week	Total Sales for Week	Commission Rate	Commission Earned in Week
(a)	Jim Black	3	$17 614.86	3%	
(b)	Teresa Stone	4	$27 897.61	3%	
(c)	Al Brown	2	$12 483.79	3%	
(d)	John Brummel	1	$28 617.91	3%	
(e)	Rose Petralia	5	$37 816.85	3%	
(f)	Rick Halter	4	$28 491.64	3.5%	
(g)	Tracy Cullin	3	$19 768.45	3.4%	
(h)	Art Tray	6	$42 691.87	3.9%	
(i)	Jay Niemes	1	$10 486.98	4%	
(j)	Cathy Ardle	8	$56 418.33	3.8%	

3. Calculate how much Mary Lamaire, a clothing salesperson, earned in 1981.

	Month	Total Sales	Commision Rate	Commission Earned
(a)	January	$ 3 481.65	15%	
(b)	February	$ 4 796.55	15%	
(c)	March	$ 2 181.54	15%	
(d)	April	$ 8 798.99	15%	
(e)	May	$ 9 614.78	15%	
(f)	June	$14 876.65	15%	
(g)	July	$12 617.43	15%	
(h)	August	$10 891.21	15%	
(i)	September	$14 641.87	15%	
(j)	October	$15 781.89	15%	
(k)	November	$21 886.45	15%	
(l)	December	$37 891.78	15%	
(m)	TOTAL COMMISSION EARNED IN 1981			

Math YOU Need

4. List some disadvantages to being paid by commission. Give reasons for your choice.

6.10 Salary Plus Commission

Many sales people are paid a salary plus a commission.
For example, Henry is a carpet salesperson. He earns a weekly salary of $189.00 plus a 3% commission on his total sales. One week, he sold $1241.96 worth of carpets. What were his total weekly earnings?

TOTAL WEEKLY EARNINGS = WEEKLY SALARY + COMMISSION EARNINGS
= $189.00 + ($1241.96 × 3%)
= $189.00 + $37.26
= $226.26

1. Calculate the weekly earnings for these sales people.

	Sales Person	Weekly Salary	Total Sales	Commission Rate	Commission Earnings	Total Weekly Earnings
(a)	Donna Love	$175.00	$ 973.61	3%	$973.61 × 3% = $29.21	$175.00 + $29.21 = $204.21
(b)	Tracy Mullin	$189.00	$ 861.49	2%		
(c)	Mike Savich	$165.00	$1 071.89	3%		
(d)	Jason Richard	$190.00	$1 176.95	2.5%		
(e)	Dawn Legere	$195.00	$1 243.78	4%		
(f)	Yanira Blanco	$200.00	$1 254.91	3.8%		
(g)	Chris Rocchetta	$210.00	$2 136.71	2.9%		
(h)	Sally Rube	$250.00	$2 987.86	1.5%		
(i)	Jim Dagmar	$175.00	$4 168.32	4%		
(j)	Bali Sing	$205.00	$3 179.45	5%		

2. The sales people at Writer's Book Store are paid a salary plus a commission on sales over $400 a week. Complete this record sheet.

	Sales Person	Weekly Salary	Total Sales	Amount over $400	Commission Rate	Commission Earnings	Weekly Earnings
(a)	Rolan Tullock	$165.00	$583.00	$583 − $400 = $183	4%	$183 × 4% = $7.32	$165.00 + $7.32 = $172.32
(b)	Teresa Marie	$165.00	$629.00		4%		
(c)	Lisa Sellers	$165.00	$786.00		4%		
(d)	Rob Arthurs	$170.00	$421.00		4%		
(e)	Teo Foresta	$175.00	$399.00		4%		
(f)	John Perraro	$180.00	$761.00		4%		
(g)	John Pucic	$180.00	$845.45		4%		
(h)	Jean Wilkers	$180.00	$917.61		4%		
(i)	Anne Beatty	$190.00	$765.89		4%		
(j)	Cathy Vanloo	$195.00	$405.76		4%		

(k) Who earned the most commission?
(l) Who earned the least commission?
(m) How much did Writer's Book Store pay in commissions for the week?

Math YOU Need

3. Jim Dagmar, in question 1, uses his commission earnings to make a $135-a-month payment on his car. What is the least amount his total sales can be each week to make the payment?

6.11 CPP Deductions

WEEKLY PAY PERIOD

Earnings	CPP	Earnings	CPP	Earnings	CPP
$144.73-145.27	2.16	$184.73-185.27	2.88	$224.73-225.27	3.60
145.28-145.83	2.17	185.28-185.83	2.89	225.28-225.83	3.61
145.84-146.38	2.18	185.84-186.38	2.90	225.84-226.38	3.62
146.39-146.94	2.19	186.39-186.94	2.91	226.39-226.94	3.63
146.95-147.49	2.20	186.95-187.49	2.92	226.95-227.49	3.64
147.50-148.05	2.21	187.50-188.05	2.93	227.50-228.05	3.65
148.06-148.61	2.22	188.06-188.61	2.94	228.06-228.61	3.66
148.62-149.16	2.23	188.62-189.16	2.95	228.62-229.16	3.67
149.17-149.72	2.24	189.17-189.72	2.96	229.17-229.72	3.68

The above table shows some Canada Pension Plan (CPP) figures. This is one of the deductions taken from a pay (in this case, each week). The employer also pays this amount.

1. Use the above table to calculate how much these people and their employers pay each week for CPP.

	Employee	Amount Earned	Amount Deducted	Amount Paid By Employer
(a)	Jim Sedge	$188.89	$2.95	$2.95
(b)	Joe Stokes	$185.61		
(c)	Larry Wills	$146.24		
(d)	Isabel Keats	$188.26		
(e)	Betty Smith	$227.79		
(f)	Tai Yeung	$148.87		
(g)	Al Flecher	$225.45		
(h)	Heather Seams	$229.04		

(i) How much would the employer have to pay for CPP deductions in a week?

2. Use the table below to find the bi-weekly CPP deductions for the people in the chart.

BI-WEEKLY PAY PERIOD

Earnings	CPP	Earnings	CPP	Earnings	CPP
$409.73-410.27	6.48	$449.73-450.27	7.20	$489.73-490.27	7.92
410.28-410.83	6.49	450.28-450.83	7.21	490.28-490.83	7.93
410.84-411.38	6.50	450.84-451.38	7.22	490.84-491.38	7.94
411.39-411.94	6.51	451.39-451.94	7.23	491.39-491.94	7.95
411.95-412.49	6.52	451.95-452.49	7.24	491.95-492.49	7.96
412.50-413.05	6.53	452.50-453.05	7.25	492.50-493.05	7.97
413.06-413.61	6.54	453.06-453.61	7.26	493.06-493.61	7.98
413.62-414.16	6.55	453.62-454.16	7.27	493.62-494.16	7.99
414.17-414.72	6.56	454.17-454.72	7.28	494.17-494.72	8.00

	Employee	Amount Earned	Amount Deducted	Earnings After Deduction	Amount Deducted From Employer
(a)	Jeremy Slate	$410.00	$6.48	$403.52	$6.48
(b)	Peter Hail	$414.25			
(c)	Margo Savoie	$453.75			
(d)	Sandra Shaw	$489.79			
(e)	Tracey Eddie	$452.65			
(f)	Tony Wiggers	$413.87			

Math YOU Need

3. Helen earned $163.45 every week. She got a $24.56/week raise. What is her new CPP deduction?

6.12 UIC Deductions

WEEKLY PAY PERIOD

Earnings	UI Premium	Earnings	UI Premium	Earnings	UI Premium
174.73-175.27	2.36	214.73-215.27	2.90	254.73-255.27	3.44
175.28-175.83	2.37	215.28-215.83	2.91	255.28-255.83	3.45
175.84-176.38	2.38	215.84-216.38	2.92	255.84-256.38	3.46
176.39-176.94	2.38	216.39-216.94	2.92	256.39-256.94	3.46
176.95-177.49	2.39	216.95-217.49	2.93	256.95-257.49	3.47
177.50-178.05	2.40	217.50-218.05	2.94	257.50-258.05	3.48
178.06-178.61	2.41	218.06-218.61	2.95	258.06-258.61	3.49
178.62-179.16	2.42	218.62-219.16	2.96	258.62-259.16	3.50
179.17-179.72	2.42	219.17-219.72	2.96	259.17-259.72	3.50

Another deduction is UIC — Unemployment Insurance Commission. The above table shows some weekly earnings and amounts to be deducted for UIC. An employer must pay 1.4 times as much as an employee.

1. Use the above table to find the UIC contributions for these people.

	Employee	Amount Earned Per Week	UIC Amount Deducted Per Week	Pay After UIC Deduction	Employer's Contribution
(a)	Art Wrall	$214.75	$2.90	$214.75 − $2.90 = $211.85	$2.90 × 1.4 = $4.06
(b)	Terry Wilkens	$218.00			
(c)	Ross Bane	$179.65			
(d)	Paul Hant	$258.00			
(e)	Al Soper	$216.32			
(f)	Mariel Fernadez	$258.31			

2. Use the UIC table below to find the monthly deductions for the people in the chart.

MONTHLY PAY PERIOD

Earnings	UI Premium	Earnings	UI Premium	Earnings	UI Premium
1762.50-1767.49	16.96	2122.50-2127.49	16.96	2482.50-2487.49	16.96
1767.50-1772.49	16.96	2127.50-2132.49	16.96	2487.50-2492.49	16.96
1772.50-1777.49	16.96	2132.50-2137.49	16.96	2492.50-2497.49	16.96
1777.50-1782.49	16.96	2137.50-2142.49	16.96	2497.50-2502.49	16.96
1782.50-1787.49	16.96	2142.50-2147.49	16.96	2502.50-2507.49	16.96
1787.50-1792.49	16.96	2147.50-2152.49	16.96	2507.50-2512.49	16.96
1792.50-1797.49	16.96	2152.50-2157.49	16.96	2512.50-2517.49	16.96
1797.50-1802.49	16.96	2157.50-2162.49	16.96	2517.50-2522.49	16.96

	Employee	Amount Earned Per Month	UIC Deducted Per Month	Pay After UIC Deduction	Employer's Contribution
(a)	Jim Wren	$2127.60			
(b)	Cathy Bird	$2497.80			
(c)	Karen Bleak	$1782.50			
(d)	Carl Finch	$2500.00			
(e)	Jodie First	$2157.49			
(f)	Mary Love	$1766.40			

Math YOU Need

3. Does an employer have to pay more for UIC when he or she gives a raise to an employee? Give a reason for your answer.

6.13 Income Tax Deductions

WEEKLY TAX DEDUCTIONS
Basis — 52 Pay Periods per Year

WEEKLY EARNINGS Use appropriate bracket	IF THE EMPLOYEE'S "NET CLAIM CODE" ON FORM TD1 IS							
	1	2	3	4	5	6	7	8
	DEDUCT FROM EACH PAY							
$300.00-304.99	56.40	54.70	52.30	50.55	48.50	46.25	43.75	40.70
305.00-309.99	57.85	56.15	53.80	52.05	49.95	47.75	45.20	42.15
310.00-314.99	59.25	57.65	55.25	53.50	51.45	49.20	46.65	43.60
315.00-319.99	60.75	59.00	56.70	54.95	52.90	50.65	48.15	45.10
320.00-324.99	62.30	60.50	58.15	56.45	54.40	52.15	49.60	46.55
325.00-329.99	63.85	62.10	59.65	57.95	55.90	53.65	51.15	48.10
330.00-334.99	65.40	63.65	61.20	59.40	57.40	55.15	52.65	49.60
335.00-339.99	66.95	65.20	62.75	60.95	58.85	56.70	54.15	51.10
340.00-344.99	68.50	66.75	64.30	62.50	60.35	58.15	55.65	52.60
345.00-349.99	70.05	68.30	65.85	64.05	61.95	59.65	57.20	54.15
350.00-354.99	71.60	69.85	67.40	65.60	63.50	61.20	58.65	55.65
355.00-359.99	73.15	71.40	68.95	67.15	65.05	62.75	60.15	57.15
360.00-364.99	74.70	72.95	70.50	68.70	66.60	64.30	61.70	58.60
365.00-369.99	76.25	74.50	72.05	70.25	68.15	65.85	63.25	60.10
370.00-374.99	77.80	76.05	73.60	71.80	69.70	67.40	64.80	61.65

The biggest deduction from earnings is income tax. The size of the deduction is based on two factors:

- amount earned
- "Net Claim Code" (this is calculated on an employee's T.D.1. form showing personal claims, exemptions etc.).

The above table shows the income tax deductions for some weekly earnings.

All WEEKLY EARNINGS are *after* CPP and UIC deductions.

For example, Louise earns $325.00 per week. Her net claim code is 8. How much income tax is deducted from her pay each week?

First: find $325.00 in the far left column.
Second: move along the line of tax deductions until you come to the column for "net claim code" 8.
The amount deducted each week is $48.10.

1. Use the above table to find the weekly income tax deductions for these employees.

	Employee	Weekly Earnings	Net Claim Code	Income Tax Deducted
(a)	Ted Reever	$341.00	7	$55.65
(b)	Helen Knight	$367.50	5	
(c)	Ray Larochelle	$329.00	8	
(d)	Yvonne Brown	$315.50	4	
(e)	Tim Young	$374.25	6	
(f)	Rose Stacey	$348.90	2	
(g)	Alex Hender	$316.75	1	
(h)	Lois Plane	$361.35	3	

Math YOU Need

2. Alex Hender, in question 1, got a 7% raise in pay. What is his new income tax deduction?

6.14 Total Deductions

This page will give you practice in calculating the total deductions from a person's earnings.
Use these tables to answer the questions below.

WEEKLY CPP AND UIC DEDUCTIONS

Gross Earnings	CPP	UI Premium
194.73-195.27	3.06	2.63
195.28-195.83	3.07	2.64
195.84-196.38	3.08	2.65
196.39-196.94	3.09	2.65
196.95-197.49	3.10	2.66
197.50-198.05	3.11	2.67
198.06-198.61	3.12	2.68
198.62-199.16	3.13	2.69
199.17-199.72	3.14	2.69
199.73-200.27	3.15	2.70
200.28-200.83	3.16	2.71
200.84-201.38	3.17	2.71
201.39-201.94	3.18	2.72
201.95-202.49	3.19	2.73
202.50-203.05	3.20	2.74
203.06-203.61	3.21	2.74
203.62-204.16	3.22	2.75
204.17-204.72	3.23	2.76

Gross Earnings	CPP	UI Premium
204.73-205.27	3.24	2.77
205.28-205.83	3.25	2.77
205.84-206.38	3.26	2.78
206.39-206.94	3.27	2.79
206.95-207.49	3.28	2.80
207.50-208.05	3.29	2.80
208.06-208.61	3.30	2.81
208.62-209.16	3.31	2.82
209.17-209.72	3.32	2.83
209.73-210.27	3.33	2.84
210.28-210.83	3.34	2.84
210.84-211.38	3.35	2.85
211.39-211.94	3.36	2.86
211.95-212.49	3.37	2.86
212.50-213.05	3.38	2.87
213.06-213.61	3.39	2.88
213.62-214.16	3.40	2.89
214.17-214.72	3.41	2.89

WEEKLY TAX DEDUCTIONS

WEEKLY PAY* Use appropriate bracket *Less C.P.P. and U.I.C.	IF THE EMPLOYEE'S "NET CLAIM CODE" ON FORM TD1 IS						
	1	2	3	4	5	6	7
	DEDUCT FROM EACH PAY						
195.00-196.99	26.45	24.85	22.70	21.15	19.25	17.35	15.15
197.00-198.99	26.95	25.40	23.25	21.65	19.80	17.85	15.65
199.00-200.99	27.50	25.95	23.80	22.20	20.35	18.35	16.20
201.00-202.99	28.00	26.45	24.30	22.75	20.85	18.85	16.70
203.00-204.99	28.55	27.00	24.85	23.25	21.40	19.35	17.20
205.00-206.99	29.10	27.55	25.35	23.80	21.90	19.90	17.70
207.00-208.99	29.60	28.05	25.90	24.30	22.45	20.45	18.20
209.00-210.99	30.15	28.60	26.45	24.85	23.00	20.95	18.70
211.00-212.99	30.70	29.10	26.95	25.40	23.50	21.50	19.20
213.00-214.99	31.20	29.65	27.50	25.90	24.05	22.00	19.75

1. Calculate the total deductions for each employee.

	Employee	Gross Weekly Earnings	Net Claim Code	CPP Deduction	UIC Deduction	Income Tax Deduction	Total Deductions
(a)	Roger Owens	$202.75	3	$3.20	$2.74	$24.30	$30.24
(b)	Peter Hale	$205.70	1				
(c)	Frank Bye	$209.65	6				
(d)	Martha Kape	$212.40	7				
(e)	Henry Keller	$213.76	4				

Math YOU Need

2. "Net earnings" is the money you get to keep after deductions.
   (a) Are the earnings after deductions in question 1 net earnings?
   (b) What other deductions are there?

6.15 Think About It: Insurance Sales Commissions

Many insurance sales people are paid commissions on the policies they sell. The table below shows the commission schedule for the Healthy Life Insurance Co. The commission rates vary with the types of policies. Commissions are paid on first year premiums *only*, not on the amount of the policy.

Contract Code Number	Commissions on First-Year Premiums	
00	Whole Life	55%
01	20 Payment Life	50%
02	10 Payment Life	25%
03	Single Payment Life	5%
04	Endowment Age 85	65%
05	20 a Endowment	35%
06	15 a Endowment	25%
07	10 a Endowment	20%
08	Life Paid Up At Age 65	60%
09	Retirement Income Age 65	55%
10	Term To Age 65	35%

For Example, Ken Meek sold a Whole Life policy. Its first-year premium was $295. How much commission did Ken earn on this sale?

COMMISSION EARNED = FIRST-YEAR PREMIUM × COMMISSION RATE
= $295 × 55%
= $295 × 0.55
= $162.25

1. Use the above schedule to calculate these commission earnings for employees at Healthy Life.

	Employee	Contract Code Number	First-Year Premium	Commission Earned
(a)	Ray Flower	01	$316	
(b)	Jean Splint	04	$194	
(c)	Chuck Femur	09	$422	
(d)	Graham Krack	10	$ 52	
(e)	Joe Fisk	00	$629	
(f)	Marie Lender	06	$570	
(g)	Tom Connor	05	$350	
(h)	Sage Salem	03	$498	

(i) Who earned the most commission?

2. Calculate Mary Orbor's total commission earnings for these policies.

	Contract Code Number	First-Year Premium	Commission Earned
(a)	00	$830	
(b)	08	$508	
(c)	03	$210	
(d)	10	$375	
(e)	09	$720	
(f)	07	$146	
(g)	TOTAL COMMISSION EARNED		

3. Ray Down earns $1475/month plus commission. What did he earn the month he sold four whole life policies, with first-year premiums of $392 each?

6.16 Test-Run

UNIT 6 REVIEW TEST

Now that you have learned how to "earn money", try this review test.

1. Calculate the overtime pay for each person.

	Person	Hourly Wage	Overtime Rate	Hours of Overtime	Overtime Pay
(a)	Ted	$ 7.50	$1\frac{1}{2}$	9	
(b)	Rich	$ 9.25	2	7	
(c)	Morris	$ 6.18	2	6	
(d)	Blake	$ 7.34	$1\frac{1}{2}$	5.5	
(e)	Toni	$10.56	$1\frac{1}{2}$	8.5	
(f)	Earl	$11.12	$1\frac{1}{2}$	10	
(g)	Ray	$19.82	2	12	
(h)	Mike	$21.45	2	13.5	

2. Carl sold a whole life policy with a first-year premium of $545. His commission on the policy is 46%. How much commission did he earn?

3. Marilyn earns 12% commission on her sales. How much did she earn if she sold $9875 worth of merchandise?

UNIT 7 PREVIEW TEST

These are some of the skills you will need for Unit 7:

- adding, subtracting and multiplying with decimal fractions
- percent of a number
- percent to a decimal fraction

Try this test. How many can you do in 15 min?

1. Add.
   (a) 6.8 + 3.6 =
   (b) 9.7 + 0.12 =
   (c) 0.94 + 1.8 =
   (d) 3.76 + 0.2 =

2. Subtract.
   (a) 6.31 − 2.8 =
   (b) 4.55 − 4.1 =
   (c) 7.86 − 0.12 =
   (d) 3.54 − 1.864 =

3. Multiply.
   (a) 6.1 × 1.1 =
   (b) 2.01 × 1.01 =
   (c) 3.9 × 9.3 =
   (d) 7.84 × 0.12 =

4. Find:
   (a) 6% of 3 =
   (b) 12% of 19 =
   (c) 7% of 6 =
   (d) 10% of 89 =

5. Change these to decimal fractions.
   (a) 67% =
   (b) 24% =
   (c) 97% =
   (d) 45.5% =
   (e) 64.7% =
   (f) 3.2% =

TAKE-A-BREAK: MULTIPLYING DECIMAL FRACTIONS

And when the man walked up to his boss, speaking words the foreman thought funny, Never a truer phrase was spoken when he said:

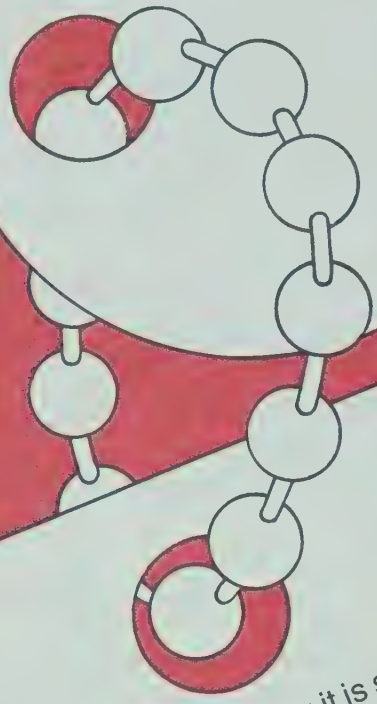
" .....!"

Complete the last line of this verse by answering the questions below and using the code.

14.49 = A	5.61 = M
0.21 = I	0.96 = O
2.5 = N	24.18 = L
19.43 = Y	0.93 = T
14.58 = F	95.37 = R
7.56 = H	8.16 = E

2.1 × 0.1 = _____ 6.3 × 2.3 = _____ 0.3 × 3.2 = _____
5.1 × 1.1 = _____ 2.5 × 1.0 = _____
7.8 × 3.1 = _____
6.7 × 2.9 = _____

0.21 × 1.0 = _____ 21.0 × 0.01 = _____ 1.8 × 8.1 = _____ 0.31 × 3.0 = _____ 0.51 × 11.0 = _____
0.1 × 25.0 = _____ 0.3 × 3.1 = _____ 3.0 × 0.32 = _____ 5.4 × 1.4 = _____ 3.2 × 0.3 = _____
86.7 × 1.1 = _____ 1.6 × 5.1 = _____ 0.25 × 10.0 = _____
5.1 × 1.6 = _____
2.9 × 6.7 = _____



UNIT 7
Savings and Interest

Spending money is fun. Saving it is smart. This Unit shows you how to save money and make it work for you.

7.1 Warm-up: Addition, Subtraction, Multiplication, Decimal Fractions
7.2 Warm-up: Percent of a Number
7.3 Warm-up: Percent to Decimal Fraction
7.4 Types of Savings Institutions and Accounts
7.5 The Information Sheet
7.6 Deposit Slips
7.7 Cheques
7.8 Passbook
7.9 Record Book
7.10 Withdrawals
7.11 Monthly Statements
7.12 Interest
7.13 Simple Interest
7.14 Calculating Monthly Interest
7.15 Interest Rates—Comparing
7.16 Installments and Amortizing
7.17 Think About It: Compound Interest
7.18 Test Run: Unit Review Test
Unit 8 Preview Test
Take-a-Break

Before you learn how easy it is to save money, try Warm-ups 7.1, 7.2 and 7.3.

7.1 Warm-up: +, −, × Decimal Fractions

1. Add.
   (a) 6.8 + 3.2 =
   (b) 9.71 + 8.09 =
   (c) 8.3 + 2.12 =
   (d) 7.01 + 8.12 + 0.3 =
   (e) 97.1 + 8.39 + 1.12 =
   (f) 21.8 + 2.01 + 8.09 =
   (g) 9.14 + 0.02 + 8.0008 =
   (h) 27.186 + 2.86 + 0.86 =
   (i) 9.3 + 3.9 + 9.3 + 0.93 =

2. Subtract.
   (a) 21.79 − 0.083 =
   (b) 18.16 − 1.021 =
   (c) 9.78 − 2.176 =
   (d) 0.13 − 0.08 =
   (e) 197.6 − 184.796 =
   (f) 2.013 − 0.817 =

3. Multiply.
   (a) 2.17 × 3.8 =
   (b) 2.84 × 0.12 =
   (c) 9.7 × 1.01 =
   (d) 1.01 × 87.1 =
   (e) 64.3 × 2.18 =
   (f) 9.34 × 0.006 =

7.2 Warm-up: Percent of a Number

There are 5 wrong answers in questions 1 and 2. Find them. Write the corrected answers in your notebook.

1. Find:
   (a) 56% of 45 = 25.2
   (b) 21% of 18 = 3.78
   (c) 19% of 61 = 11.5
   (d) 32% of 91 = 29.12
   (e) 19% of 19 = 3.68
   (f) 81% of 2 = 1.62
   (g) 14% of 36 = 5.04
   (h) 89% of 29 = 25.81
   (i) 19% of 90 = 17.1

2. Find:
   (a) 12.1% of 3 = 0.363
   (b) 22.6% of 75 = 16.95
   (c) 0.2% of 18 = 0.036
   (d) 9% of 21 = 0.189
   (e) 8.3% of 64 = 5.312
   (f) 0.12% of 81 = 0.8
   (g) 9.6% of 5 = 0.48
   (h) 0.125% of 6 = 0.0075
   (i) 1% of 1 = 0.001

7.3 Warm-up: Percent to Decimal Fraction

1. Change these percents to decimal fractions.
   (a) 67% =
   (b) 21% =
   (c) 94% =
   (d) 78% =
   (e) 23% =
   (f) 4% =
   (g) 16% =
   (h) 2% =
   (i) 100% =

2. Change these percents to decimal fractions.
   (a) 6.3% =
   (b) 12.8% =
   (c) 9.1% =
   (d) 16.2% =
   (e) 0.18% =
   (f) 9.72% =
   (g) 3.1% =
   (h) 2.5% =
   (i) 0.101% =

7.4 Types of Savings Institutions and Accounts

Certain businesses deal only with money. You might call them "financial stores". These business institutions will help you manage your money:

- bank
- trust company
- credit union.

Each institution usually offers three basic accounts with these features:

Account	Basic Features
savings	—interest given on money in account (usually 7% to 16%/a, depending on institution) —no chequing allowed; money must be withdrawn in person
personal-chequing	—no interest is given on money in account —cheques can be written usually for a small fee (about 18¢ to 25¢ a cheque)

Account	Basic Features
chequing-savings	—interest is given on money in account (usually 3%/a to 6%/a, depending on institution) —cheques can be written, usually for a small fee (about 18¢ to 25¢ a cheque)

For example, Peter has a savings account at a bank. He has $549 in the account. The money in the account earns interest at a rate of $9\frac{3}{4}$%/a. How much money will Peter's account earn in one year?

AMOUNT EARNED = MONEY IN ACCOUNT × RATE OF INTEREST

Peter's amount earned = $549 × $9\frac{3}{4}$%
= $549 × 9.75% ← Change fraction to a decimal.
= $53.53 rounded to nearest cent

1. Calculate the amount earned for each of these people who have savings accounts.

	Name	Type of Account	Rate of Interest	Amount in Account	Amount earned Per Year	Amount in Account after 1 a
(a)	Joan	savings	8.75%	$638	$638 × 8.75% = $55.83	$638 + $55.83 = $693.83
(b)	Helen	savings	10.25%	$249		
(c)	Robert	savings	$16\frac{1}{4}$%	$821		
(d)	Carl	chequing-savings	4%	$758		
(e)	Marie	savings	15.75%	$613		

2. Calculate how much these people have to pay for writing cheques in a month.

	Name	Type of Account	Cost to Write One Cheque	Number of Cheques/Month	Cost to Write Cheques/Month
(a)	Burt	personal chequing	18¢	17	
(b)	Raulito	personal chequing	19¢	24	
(c)	Teresa	chequing savings	21¢	18	
(d)	Tracey	personal chequing	21¢	31	

Math YOU Need

3. Burt's bank offered the following deal: "Write all your cheques for just $3.00 per month". Should Burt take the deal? Use the information in question 2 (a).

7.5 The Information Sheet

When a person wants to open an account, banks and other institutions have the applicant fill out an information sheet.

1. Copy and complete this information sheet as if you were opening an account.

ACCOUNT INFORMATION

PERSONAL INFORMATION - TO BE COMPLETED BY CUSTOMER
(If Joint Account being opened - use separate form for each person.)

MR. ☐ MRS. ☐ MISS ☐ MS ☐ | LAST NAME | FIRST NAME | INITIALS

STREET (Specify St./Ave./Rd.) | APT. NO. | HOW LONG?

TOWN/CITY | PROVINCE | POSTAL CODE

IF LESS THAN TWO YEARS AT ABOVE ADDRESS, PREVIOUS ADDRESS

STREET (Specify St./Ave./Rd.) | APT. NO. | HOW LONG?

TOWN/CITY | PROVINCE | POSTAL CODE

BUSINESS TELEPHONE | RESIDENCE TELEPHONE

MARITAL STATUS MARRIED ☐ SINGLE ☐ DIVORCED ☐ SEPARATED ☐ WIDOW ☐ WIDOWER ☐ OTHER ☐

DATE OF BIRTH — Day | Month | Year

EMPLOYER (OCCUPATION IF SELF-EMPLOYED)

EMPLOYER'S ADDRESS

DEPARTMENT AND POSITION | NO. OF YEARS EMPLOYED

IF LESS THAN 2 a. PREVIOUS EMPLOYMENT

SPOUSE'S FIRST NAME OR NAME OF NEXT OF KIN

ADDRESS OF SPOUSE OR NEXT OF KIN

JOINT ACCOUNT WITH

MR. ☐ MRS. ☐ MISS ☐ MS ☐

NAME | TYPE OF ACCOUNT | ACCOUNT NUMBER

2. Which parts were you not able to fill in? Why?

Math YOU Need

3. Make up 2 other questions that you feel should be on the information sheet.

7.6 Deposit Slips

Depositing money into any of the three basic accounts is done by filling out a deposit slip.

1. Copy and complete these deposit slips. The first one is done for you.

(a)

MARITIME BANK

ACCOUNT NO. 04 7759 July 4 19 79

NAME John P. Saver

CHEQUES AND COUPONS		CASH		
231	00	6 × 1	6	00
465	00	8 × 2	16	00
29	50	10 × 5	50	00
		7 × 10	70	00
		4 × 20	80	00
		×		
		×		
		COIN	5	70
725	50	CHEQUES AND COUPONS BROUGHT FORWARD	725	50
		SUB TOTAL	953	20
		RECEIVED IN CASH WHICH IS DEDUCTED FROM THIS DEPOSIT	260	00
		SIGNATURE John P. Saver		
		DEPOSITOR'S INITIAL JPS. TOTAL ▷	693	20

(b)

MARITIME BANK

ACCOUNT NO. 19

NAME

CHEQUES AND COUPONS		CASH		
17	29	20 × 1		
4	54	5 × 2		
6	95	9 × 5		
30	00	4 × 10		
95	75	1 × 20		
		×		
		×		
		COIN		
		CHEQUES AND COUPONS BROUGHT FORWARD		
		SUB TOTAL		
		RECEIVED IN CASH WHICH IS DEDUCTED FROM THIS DEPOSIT		
		SIGNATURE		
		DEPOSITOR'S INITIAL TOTAL ▷		

(c)

MARITIME BANK

ACCOUNT NO. 19

NAME

CHEQUES AND COUPONS		CASH		
3	95	× 1	112	00
6	50	× 2		
7	00	× 5		
12	95	× 10		
6	75	× 20		
8	49	×		
7	64	×		
7	64	COIN	96	75
		CHEQUES AND COUPONS BROUGHT FORWARD		
		SUB TOTAL		
		RECEIVED IN CASH WHICH IS DEDUCTED FROM THIS DEPOSIT		
		SIGNATURE		
		DEPOSITOR'S INITIAL TOTAL ▷		

2. Copy and complete this deposit slip.

DEPOSIT SLIP **MARITIME BANK**

Date: Aug. 8, 1981

Account Number: 06-6/6/8

Deposit to the account of: Peter Waller

Depositor's Initials: PW

Teller's Initials: JS

Peter Waller
Signature for Cash Received

Cheques & Coupons				
189	76	Cash	479	00
47	81			
63	79			
281	08	Coin	3	24
579	61	Cheques & Coupons		
		Total		
		Cash Received	258	00
		Net Deposit		

Math YOU Need

3. Peter Waller, in question 2, withdraws $258. each week. How many weeks will it take to make his account balance $0?

7.7 Cheques

Items can be paid for by cash, charge accounts, or cheques.
For example, Sandra Wiley bought a dress for $39.47 from Jane's Fashions. She paid for it with a cheque. Her completed cheque looked like this:

SANDRA WILEY
1030 SPRUCE STREET
MEDICINE HAT

Personal Service Plan

June 3 19 81 No. ____

Pay to the order of Jane's Fashions $ 39 47

Thirty-Nine 47/100 Dollars

BANK OF ALBERTA
KING ST. EAST AT WILSON RD.
566 KING ST.
MEDICINE HAT

Sandra Wiley

⑆126 2⑈828⑆ 1 80058⑈130⑈

Copy and complete these cheques for these people.
Use this blank cheque as a guide.

SOCIAL BANK
MAIN BRANCH
WINNIPEG

____ 19 ____

Pay to the Order of ____ $ ____

____

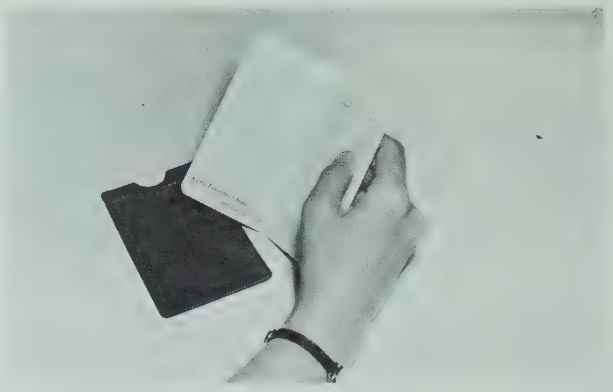
Account No. ____

1. Jack Wentworth: bought a chainsaw from Gray's Hardware for $178.79 on May 12, 1981.
2. Marie Dalfina: bought a 10-speed bicycle from Holly's Bikes for $248.56 on March 4, 1982.
3. Robert Jones: bought a raincoat from The Stag Shop for $87.67 on April 27, 1981.
4. Rita Jaminski: bought a set of records from The Spin Record Shoppe for $32.91 on December 16, 1981.

Math YOU Need

5. Could you cash a cheque that had been ripped, then taped back together again? Give a reason for your answer.

7.8 Passbook



Knowing where your money is going is very important. A passbook (or record book) is given with a savings or chequing-savings account. A record of all money dealings in the account are kept in it. The deposits and withdrawals are filled in by a bank teller. Sometimes the teller uses the computer to record the withdrawals and deposits.

1. (a) Copy and complete the balance column for this passbook page.

DATE		PARTICULARS	WITHDRAWAL	DEPOSIT	BALANCE
Feb.	5/81	fwd			2 146.59
	7/81	dep		209.26	2 355.85
	15/81	nbw	350.00		
	28/81	nbd		1 525.00	
Mar.	5/81	dm	3.50		
	30/81	lnp	75.00		
Apr.	25/81	dep		1 525.00	
	28/81	wd	1 249.75		
May	5/81	nbw	45.50		
	15/81	wd	64.95		
	28/81	dep		1 525.00	
June	5/81	wd	25.00		
	20/81	wd	465.75		
	28/81	dep		1 500.00	
July	7/81	nbw	549.50		
	15/81	sdb	7.50		
Aug.	3/81	db	3.50		
	5/81	dep		100.00	
	15/81	wd	350.00		

EXPLANATION OF SYMBOLS IN "PARTICULARS" COLUMN

CLS	— Closed Account	LNP	— Loan Payment
CM	— Credit Memo	NBD	— Deposit, without passbook
COR	— Correction	NBW	— Withdrawal, without passbook
DEP	— Deposit	SDB	— Safety Deposit Box Rental
DM	— Debit Memo	SK	— Safekeeping Charge
FWD	— Balance Forward	WD	— Withdrawal
INT	— Interest		

(b) What is the final balance on this page of the passbook?

2. Copy and complete the balance column for this passbook page.

MARITIME BANK
SAVINGS ACCOUNT

DATE		PARTICULARS	WITHDRAWAL	DEPOSIT	BALANCE
Sept.	3/81	fwd			495.75
	3	dep		49.50	545.25
	9	nbd		100.00	
	15	nbw	75.00		
	30	sdb	7.50		
Oct.	5	dep		250.00	
	15	wd	560.00		
	30	int		1.25	

Math YOU Need

3. How could the person in question 2 check to see if his or her final balance is correct?

7.9 Record Book

In a personal chequing account, you must keep your own record of cheques written and the balance.

1. Copy and complete the balance column for this page from a record book.

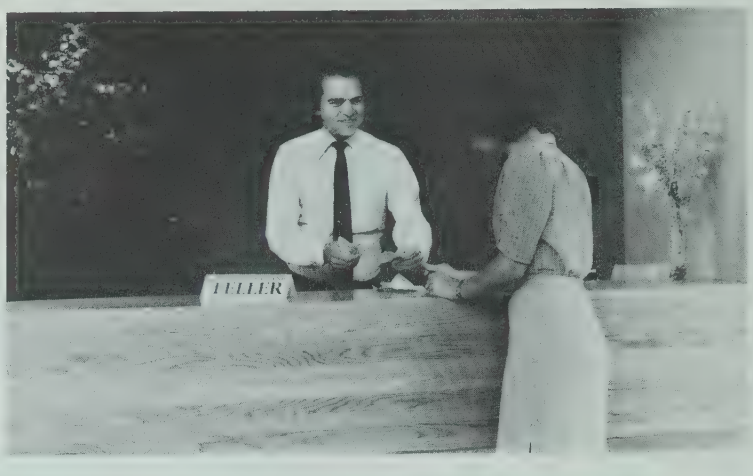
DATE		NO.	PARTICULARS	CHEQUES	DEPOSITS	BALANCE
						4 975 85
July	7/81	4	Bell Canada	12 95		4 962 90
	14/81	5	Hamilton Auto Club	27 50		4 935 40
	25/81	6	Master Charge Acct.	200 00		
	27/81	7	Visa Acct.	75 00		
	28/81		Pay		1 545 75	
Aug.	3/81	8	Car Insurance	275 00		
	8/81	9	Florist	15 75		
	15/81	10	Bell Canada	11 75		
	20/81	11	Hydro	54 95		
Sep.	5/81	12	T.V. Cable Co.	67 00		
	15/81	13	Plumber (water heater)	215 00		
	28/81		Pay		1 650 95	
	28/81	14	Bell Canada	15 75		
Oct.	2/81	15	Dentist	25 00		
	15/81	16	Life Insurance	75 00		
	28/81		Pay		1 650 95	
Nov.	3/81		Sale of boat (cheque)		1 750 00	
	5/81	17	Sport Store (skis)	375 00		
	15/81	18	Deposit for trip (winter break)	120 00		
	15/81	19	Bell Canada	27 95		
Nov.	18/81		Pay		1 650 95	

2. What is the final balance on the page in question 1?

Math YOU Need

3. Albert had a balance of $786.34 in his chequing account. He deposited $321.95. Could he write a cheque for a used car, selling for $1058?

7.10 Withdrawals



The opposite to "depositing" money is "withdrawing" it. This page shows two kinds of withdrawals.

Withdrawals from a savings account must be made in person at the bank.

For example, Peter Jacob wanted to withdraw $439.00 from his savings account. The completed withdrawal form looked like this:

FORM 13244 (6-70) NOT NEGOTIABLE OUTSIDE THIS OFFICE

SAVINGS ACCOUNT
CASH WITHDRAWAL RECEIPT May 28 19 83

RECEIVED
FROM **THE SOCIAL BANK** $ 439 00/100

Four Hundred - thirty Nine 00/100 DOLLARS

SAVINGS ACCOUNT NUMBER
09-41786

Peter Jacob

1. Shelly Blake withdrew $64.75 on June 28, 1981 from her savings account. The account number is 03-41978. Complete a withdrawal slip for her, using the form in the example above.

FORM 13244 (6-70) NOT NEGOTIABLE OUTSIDE THIS OFFICE

SAVINGS ACCOUNT
CASH WITHDRAWAL RECEIPT ..... 19 ...

RECEIVED
FROM **THE SOCIAL BANK** $ .....

..... DOLLARS

SAVINGS ACCOUNT NUMBER

.....

Math YOU Need

2. Why would a bank put "not negotiable outside this office" on the withdrawal slip?

7.11 Monthly Statements

Monthly statements are sent to people who have chequing accounts. They show the cheques written and the deposit made during the month. Cancelled cheques are also sent with the statement so that the customer can double-check the information on the statement.

1. On the statement below, "debits" are cheques written; "credits" are deposits.
   Find: (a) the total of all debits;
   (b) the total of all credits;
   (c) check that the balance is correct for each entry.

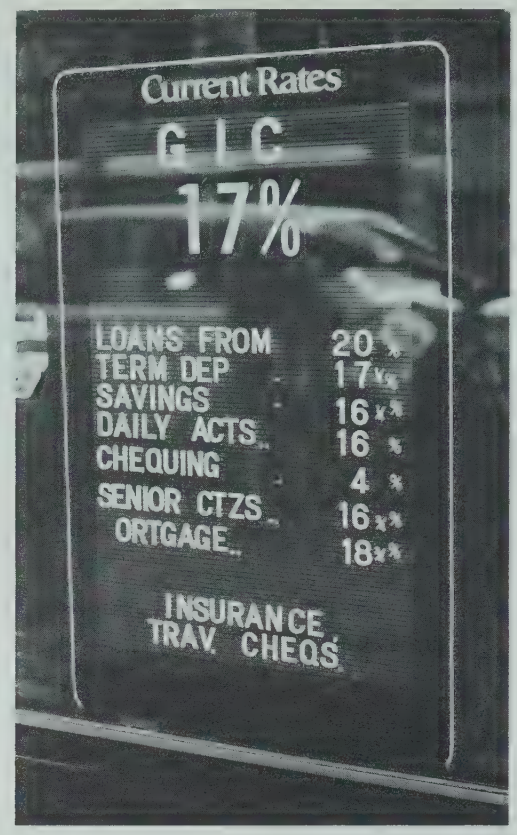
DESCRIPTION	CHEQUES/DEBITS	DEPOSITS/CREDITS	DATE	BALANCE
BALANCE FORWARD			MAY21	49088
	9000		MAY22	40088
	2268		MAY25	
	4008		MAY25	
	6400		MAY25	27420
	2006		MAY26	25414
	9000		MAY27	16414
DEPOSIT		55023	MAY29	71437
	9409		JUN01	
	23320		JUN01	38708
DEPOSIT		22000	JUN02	60708
	2380		JUN03	58328
	2500		JUN05	55828
	880		JUN08	
	3228		JUN08	
	5096		JUN08	46624
	852		JUN09	
	1602		JUN09	
	1663		JUN09	
	1946		JUN09	40561
DEPOSIT		11574	JUN10	
	2106		JUN10	50135
	2875		JUN11	
	3000		JUN11	
	12700		JUN11	31560
DEPOSIT		54000	JUN12	85560
	1023		JUN15	
	3307		JUN15	81230
	595		JUN16	
GC 3204	1000		JUN16	
	1117		JUN16	78518
	3221		JUN17	75297

FINAL BALANCE OF THIS STATEMENT

Math YOU Need

2. Agree or disagree with this statement: A personal chequing account is better than the other two kinds of accounts. Give reasons for your answer.

7.12 Interest



Did you know that your money can "earn" money? This kind of money is called *interest*.

Interest is money that is paid by an institution on money already in accounts. It is also the money a person pays to borrow money from an institution.

TERMS

Money in an account (or Borrowed) = Principal (P)

Interest paid on the Principal = a certain percent of the principal. This percent is called the Rate of Interest.

For example, Joan has $838 in a savings account. The rate of interest is $15\frac{1}{4}$%/a.

How much money will Joan's account earn in a year?

INTEREST EARNED = PRINCIPAL × RATE OF INTEREST

$$\text{Joan's amount earned} = \$838 \times 15\tfrac{1}{4}\%$$
$$= \$838 \times \frac{15.25}{100}$$
$$= \$127.80 \text{ rounded to nearest cent}$$

1. Calculate how much interest these people's accounts will earn in a year.

	Name	Principal	Rate of Interest Per Year	Interest Earned Per Year
(a)	Ted	$768.75	$14\frac{3}{4}$%	$768.75 × 14.75% = 113.39
(b)	Willy	$921.38	15.5%	
(c)	Marge	$647.79	15.75%	
(d)	Fred	$221.86	16.25%	
(e)	Harry	$198.79	14%	
(f)	Wilma	$361.84	16%	
(g)	Mary	$1248.50	14.5%	
(h)	Sheila	$1481.79	15.25%	
(i)	Gord	$1679.83	14.25%	
(j)	Carol	$2876.70	14.75%	

2. The amount to be repaid on a loan is the principal plus the interest. Calculate the amount to be repaid after one year for each of these loans.

	Name	Principal Borrowed	Rate of Interest	Interest	Amount to be Repaid
(a)	Michelle	$1150	12%	$1150 × 12% = $138	$1150 + $138 = $1288
(b)	Denise	$1275	14%		
(c)	Luke	$825	13.5%		
(d)	Graham	$965	13.75%		
(e)	Richard	$3876	11.5%		
(f)	John	$4279	16.75%		

Math YOU Need

3. John, in question 2, wanted to pay off his loan in 1 a. How much would each monthly payment be?

7.13 Simple Interest

You always repay more than you borrow. This page looks at one type of interest used in borrowing: simple interest.

Simple interest can be calculated by using this formula:

INTEREST = PRINCIPAL × RATE OF INTEREST × TIME

$I = P\ R\ T$

For example, Mr. Jones bought a car. He borrowed $2000 at the interest rate of 18%/a. How much

(a) was the interest after 1 a?

(b) was the interest after 6 months?

(c) did he owe after 6 months?

(a) $I = P\ R\ T$

$= \$2000 \times 18\% \times 1$

$= \$2000 \times \frac{18}{100} \times 1$

$= \$360$

(b) $I = P\ R\ T$

$= \$2000 \times 18\% \times \frac{6}{12}$ ← six months

← twelve months in a year

$= \$2000 \times \frac{18}{100} \times \frac{6}{12}$

$= \$180$

(c) AMOUNT OWING = PRINCIPAL + INTEREST

$= \$2000 + \$180$

$= \$2180$

1. Calculate the amount owing on these loans.

	Name	Principal Borrowed	Rate of Interest Per Year	Time to Borrow	Interest	Amount Owing
(a)	Mr. Henry	$2400	12%	18 months	$\$2400 \times \frac{12}{100} \times \frac{18}{12} = \$432$	$2400 + $432 = $2832
(b)	Mrs. Caller	$1800	12.5%	12 months		
(c)	Ms. Finch	$960	13%	20 months		
(d)	Miss Wing	$1250	13.75%	6 months		
(e)	Mr. Bride	$1110	14%	8 months		
(f)	Mr. Beaker	$875	14%	10 months		
(g)	Ms. Walker	$3650	15%	14 months		
(h)	Ms. Stoner	$9125	16%	17 months		
(i)	Mr. Gray	$10 078	16.5%	24 months		
(j)	Miss Cloude	$7164	16.5%	36 months		

2. Calculate the amount owing on each of these loans.

	Name	Principal Borrowed	Rate of Interest Per Year	Time to Borrow	Interest	Amount Owing
(a)	Dell	$1800	13%	12 months		
(b)	Ray	$1650	12%	14 months		
(c)	Peter	$2150	11%	15 months		
(d)	Jay	$1799	16%	17 months		
(e)	Kiu	$1875	15.5%	22 months		
(f)	Olivia	$2164	14.75%	18 months		
(g)	Sylvia	$2575	18%	19 months		
(h)	Frank	$3682	21%	33 months		

Math YOU Need

3. Which is better: Give a reason for your answer.
   - borrowing $3000 at 18%/a for 18 months? OR
   - borrowing $3000 at 18%/a for 48 months?

7.14 Calculating Monthly Interest

Loans paid back in installments are called "amortized" loans. The interest part of each installment is calculated on the unpaid balance, not on the original principal. The interest is calculated on a monthly basis.

Therefore, $12\%/a = \left(12 \times \frac{1}{12}\right)\%$ per month $= 1\%$ per month

For example, Joe has a loan of \$500 at a rate of 18%/a. How much is his first monthly interest payment?

$$\text{MONTHLY INTEREST} = \text{PRINCIPAL} \times \text{RATE OF INTEREST} \times \frac{1}{12}$$

$$\text{Joe's monthly interest} = \$500 \times 18\% \times \frac{1}{12}$$

$$= \$500 \times \frac{18}{100} \times \frac{1}{12}$$

$$= \$7.50$$

1. Calculate the first monthly interest payments for these loans.

	Principal	Rate	First Monthly Interest Payment
(a)	\$2700	17%	$\$2700 \times \frac{17}{100} \times \frac{1}{12} = \$38.25$
(b)	\$3650	18%	
(c)	\$8190	16%	
(d)	\$1275	17%	
(e)	\$861	15%	
(f)	\$549	16%	
(g)	\$1387	15%	
(h)	\$2146	21%	

2. Calculate the first monthly interest payments for these loans.

	Principal	Rate	First Monthly Interest Payment
(a)	\$618	13.5%	
(b)	\$729	14.75%	
(c)	\$1247	16.25%	
(d)	\$6183	16.5%	
(e)	\$12 761	15.8%	
(f)	\$2190	14.9%	
(g)	\$4160	15.75%	
(h)	\$5435	18.75%	

3. Which of these first monthly interest payments are incorrect?

	Principal	Rate	First Monthly Interest Payment
(a)	\$11 500	11%	\$105.37
(b)	\$12 578	12%	\$125.73
(c)	\$14 879	14%	\$173.59
(d)	\$16 776	18%	\$251.54
(e)	\$18 890	17%	\$291.76
(f)	\$19 780	16.5%	\$271.98

Math YOU Need

4. Gerry can afford to pay back \$250 per month on a loan. Could he borrow \$2500 for 1 a at 14.5%?

7.15 Interest rates—Comparing

It's a good idea to compare interest rates on loans. Getting the best rates always saves money.

For example, Pat wants to borrow $2000. One company will lend it to her for 17%. Another company will lend it to her for 16%. What is the

(a) cost of each loan over one year?

(b) difference in the costs of the loans?

(a) COST OF LOAN = PRINCIPAL × RATE OF INTEREST
= $2000 × 17%
= $2000 × 0.17
= $340

COST OF LOAN = $2000 × 16%
= $2000 × 0.16
= $320

(b) DIFFERENCE IN COST = LARGER COST − SMALLER COST
= $340 − $320
= $20

1. Calculate the differences in the costs of these loans over one year.

	Principal	Rate	Cost of Loan	Difference in Cost
(a)	$5000	16%	$5000 × 16% = $800	$800 − $750 = $50
	$5000	15%	$5000 × 15% = $750	
(b)	$7000	14%		
	$7000	15%		
(c)	$3500	16%		
	$3500	13.5%		
(d)	$4800	17%		
	$4800	19%		
(e)	$7650	18%		
	$7650	21%		

2. Calculate the differences in borrowing these amounts over one year.

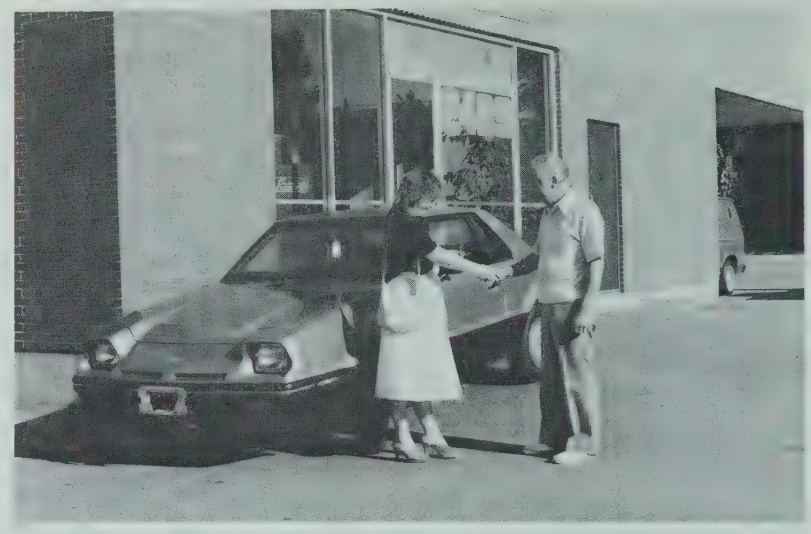
	Principal	Rate	Cost of Loan	Difference in Cost
(a)	$1280	18.7%		
	$1280	18.9%		
(b)	$1450	17.65%		
	$1450	17.82%		
(c)	$2380	16.8%		
	$2380	15.32%		
(d)	$3268	24.7%		
	$3268	24.2%		
(e)	$6891	26.73%		
	$6891	26.81%		

Math YOU Need

3. Which of these loans is the better deal?

$8500,	$8500,
16.8%/a,	15.2%/a,
paid over 3 a	paid over 2 a

7.16 Installments and Amortizing



As soon as you borrow money, you have to start paying it back.

The lender (usually a bank) arranges for payments to be made every month for a definite length of time, such as 2 a. Having the loan paid back in installments over a period of time is called amortizing the loan. The money you borrow is called the principal. Each monthly payment is made up of (1) a portion that is taken off the principal and (2) the interest. Interest is calculated on the unpaid balance each month, not on the original principal.

For example, Joe has a loan of $1100 at 18%/a. His monthly payments are $30. At the end of the first month, how much is:

(a) the interest?
(b) paid off the principal?
(c) the unpaid balance?

(a) MONTHLY INTEREST = PRINCIPAL × RATE × $\frac{1}{12}$

$= \$1100 \times 18\% \times \frac{1}{12}$

$= \$1100 \times \frac{18}{100} \times \frac{1}{12}$

$= \$16.50$

(b) MONTHLY PRINCIPAL = PAYMENT − INTEREST

$= \$30 - \$16.50$

$= \$13.50$

(c) MONTHLY BALANCE = UNPAID BALANCE − MONTHLY PRINCIPAL

$= \$1100 - \$13.50$

$= \$1086.50$

1. Calculate the breakdown of the monthly payments for a loan of $1500 at 18%/a.

	Payment Number	Unpaid Balance	Payment	Interest	Principal	Balance
(a)	1	$1500	$40	$1500 × 18% × $\frac{1}{12}$ = $22.50	$40 − $22.50 = $17.50	$1500 − $17.50 = $1482.50
(b)	2	$1482.50	$40			
(c)	3		$40			
(d)	4		$40			
(e)	5		$40			
(f)	6		$40			

(g) What is the balance owing after six months (or six payments)?

2. (a) Calculate how many monthly payments of $50 would be required to pay off a loan of $500 at 18%/a.

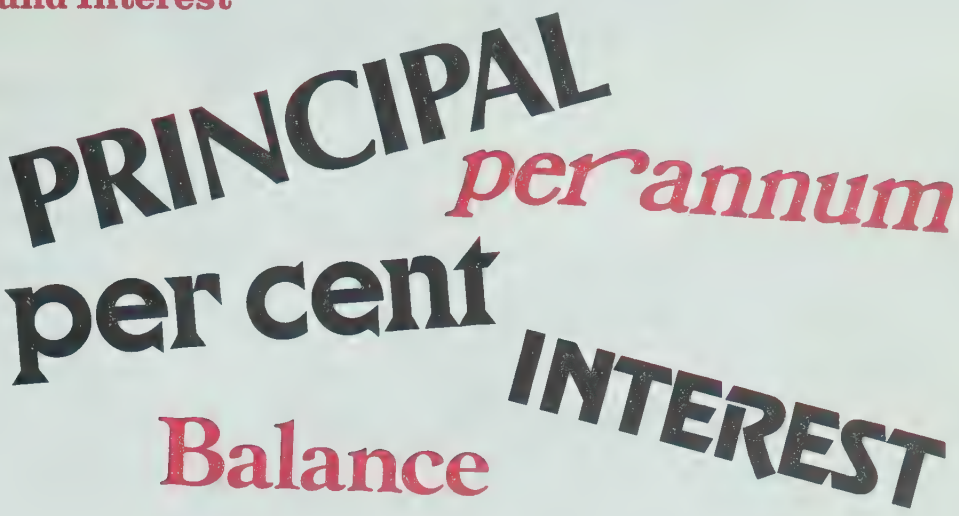
Payment Number	Unpaid Balance	Payment	Interest	Principal	Balance
1	$500	$50			

(b) How much is the final payment?
(c) What is the total amount of interest paid for the loan?

Math YOU Need

3. Carol is paying $65 per month on a loan of $875 at 16%/a. Will the loan be paid off in 2 a?

7.17 Think About It: Compound Interest



Interest on money in a savings account can be compounded. This means that twice a year (usually April 30 and October 31) interest is added to the account. The good thing about this is that interest is added to the principal *and* any interest already in the account.

For example, Roy has $500 in a savings account. The account earns interest at 16%/a, compounded twice a year. How much money will be in his account

(a) on April 30?

(b) on October 31?

(a) $\text{BALANCE} = \text{PRINCIPAL} + \left(\text{PRINCIPAL} \times \text{RATE} \times \frac{1}{2}\right)$

$= \$500 + \left(\$500 \times 16\% \times \frac{1}{2}\right)$

$= \$500 + \left(\$500 \times 0.16 \times \frac{1}{2}\right)$

$= \$500 + \left(\$80 \times \frac{1}{2}\right)$

$= \$500 + \$40$

$= \$540$

(b) $\text{BALANCE} = \text{PRINCIPAL} + \left(\text{PRINCIPAL} \times \text{RATE} \times \frac{1}{2}\right)$

$= \$540 + \left(\$540 \times 16\% \times \frac{1}{2}\right)$

$= \$540 + \left(\$86.40 \times \frac{1}{2}\right)$

$= \$540 + \$43.20$

$= \$583.20$

1. Marie put $820 in a savings account. The account earns 14%/a, compounded twice a year. Calculate how much will be in her account after 6 a.

	Interest Period	Principal	Interest	Balance
(a)	April 30, 1980	$820	$\$820 \times 14\% \times \frac{1}{2} = \$57.40$	$\$820 + \$57.40 = \$877.40$
(b)	Oct. 31, 1980	$877.40		
(c)	April 30, 1981			
(d)	Oct. 31, 1981			
(e)	April 30, 1982			
(f)	Oct. 31, 1982			
(g)	April 30, 1983			
(h)	Oct. 31, 1983			
(i)	April 30, 1984			
(j)	Oct. 31, 1984			
(k)	April 30, 1985			
(l)	Oct. 31, 1985			

2. Interest can be compounded monthly. The formula for this is

$\text{BALANCE} = \text{PRINCIPAL} + \left(\text{PRINCIPAL} \times \text{RATE} \times \frac{1}{12}\right)$

Copy and complete this chart. Calculate the balance column for 12 months based on a principal of $1400 at 11%/a, compounded monthly.

	Interest Period	Principal	Interest	Balance
(a)	January	$1400	$\$1400 \times 11\% \times \frac{1}{12} = \$12.83$	$\$1400 + \$12.83 = \$1412.83$
(b)	February	$1412.83		
(c)	March ↓ December			

7.18 Test Run

UNIT 7 REVIEW TEST

Try this review test and see how much you remember about "saving".

1. Calculate how much these people earned in their savings accounts.

	Name	Rate of Interest	Amount in Account	Amount After 1 a
(a)	Ted	$15\frac{3}{4}\%$	$741	
(b)	Joan	10.25%	$698	
(c)	Mary	10.7%	$1200	
(d)	Henry	13.5%	$1365	
(e)	George	14%	$2148	
(f)	Lia	$16\frac{3}{4}\%$	$3974	
(g)	Theresa	12%	$1286	
(h)	Dave	$11\frac{5}{8}\%$	$321	

2. Carl borrowed $2700 at 14%/a. What is the first monthly interest payment?

3. Which is the better deal?

$2300, 12.5%/a paid over 4 a	$2300, 14.6%/a paid over 2 a

UNIT 8 PREVIEW TEST

You'll need these skills for Unit 8:
- changing percent to decimal fraction
- multiplication of decimal fractions

Try to do these questions in less than 20 min.

1. Change these to decimal fractions.

(a)	78%	(g)	91.7%
(b)	69%	(h)	86.3%
(c)	21%	(i)	9.87%
(d)	32%	(j)	0.12%
(e)	83%	(k)	18.3%
(f)	2%	(l)	2.121%

2. Multiply.

(a)	2.17 × 0.10	(b)	8.3 × 1.2	(c)	9.8 × 1.8
(d)	3.01 × 0.01	(e)	2.08 × 1.8	(f)	9.301 × 0.11
(g)	6.5 × 5.6	(h)	1.011 × 0.028	(i)	0.812 × 0.13

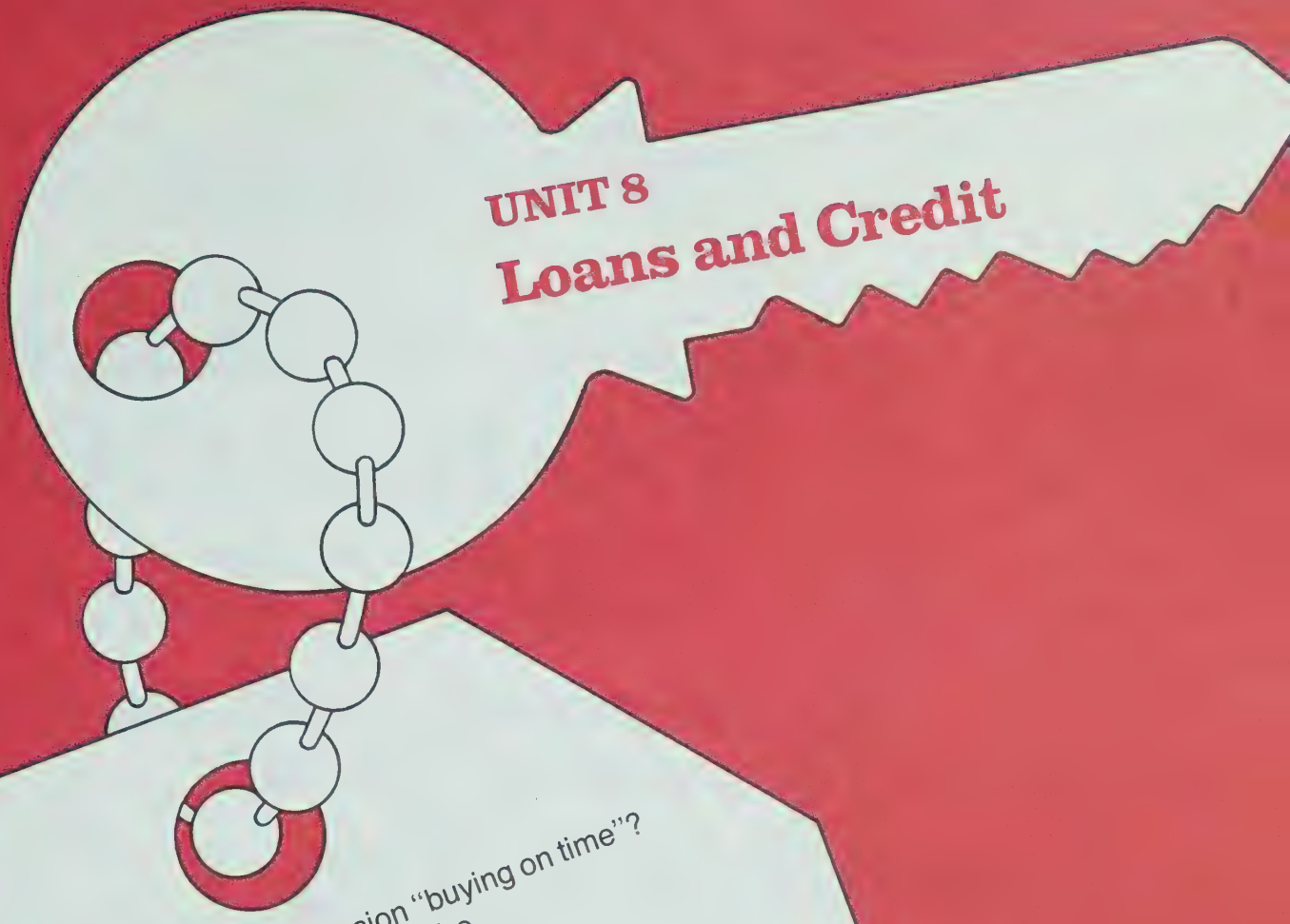
(j) $2.3 \times 1.84 =$
(k) $9.76 \times 2.3 =$
(l) $21.65 \times 2.13 =$
(m) $9.7 \times 8.64 =$

TAKE-A-BREAK: DECIMAL FRACTIONS TO PERCENTS

(a) Change these decimal fractions to percents.

0.17 =
0.01 =
0.31 =
0.02 =
0.090 =
0.4 =

(b) Now, arrange the percents in a box like this so that each horizontal row adds up to 50%. You must use all six percents.



UNIT 8
Loans and Credit

Have you ever heard the expression "buying on time"? This unit deals with the "time" part of the expression — *Loans* and *Credit*.

8.1 Warm-up: Percent to Decimal Fraction
8.2 Warm-up: Multiplication of Decimal Fractions
8.3 Sources of Loans
8.4 Loan Applications
8.5 Interest on Loans: Cost of Borrowing
8.6 Amortization Tables
8.7 Monthly Payments
8.8 Amortization Schedule
8.9 Mortgages
8.10 Costs of Mortgages
8.11 Credit Cards
8.12 Monthly Statements
8.13 Travellers' Cheques
8.14 Think About It: Credit Card Payments
8.15 Test Run: Unit 8 Review Test
Unit 9 Preview Test
Take-a-Break

Before moving on through the unit, try Warm-Ups 8.1, 8.2 and 8.3. They'll help prepare you to "buy on time"!

8.1 Warm-up: Percent to Decimal Fraction

1. Change these to decimal fractions.
   (a) 72%
   (b) 64%
   (c) 98%
   (d) 22.6%
   (e) 3.71%
   (f) 0.12%
   (g) 12.5%
   (h) 33.3%
   (i) 2.106%

2. Check these. Correct any errors.
   (a) 28% = 0.28
   (b) 31% = 0.31
   (c) 2% = 0.2
   (d) 97.6% = 0.976
   (e) 2.84% = 0.0284
   (f) 3.6% = 0.306
   (g) 321% = 3.21
   (h) 98.7% = 9.87
   (i) 25.61% = 0.2561

8.2 Warm-up: Multiplication of Decimal Fractions

1. Multiply.

   (a) $\begin{array}{r} 64 \\ \times\ 8.3 \\ \hline \end{array}$
   (b) $\begin{array}{r} 9.7 \\ \times\ 2.1 \\ \hline \end{array}$
   (c) $\begin{array}{r} 0.13 \\ \times\ 0.13 \\ \hline \end{array}$
   (d) $\begin{array}{r} 9.84 \\ \times\ 1.8 \\ \hline \end{array}$

   (e) $\begin{array}{r} 0.123 \\ \times\ 1.23 \\ \hline \end{array}$
   (f) $\begin{array}{r} 8.416 \\ \times\ 0.32 \\ \hline \end{array}$
   (g) $\begin{array}{r} 2.845 \\ \times\ 0.123 \\ \hline \end{array}$
   (h) $\begin{array}{r} 0.14 \\ \times\ 1.04 \\ \hline \end{array}$

2. Find the correct answers for these (some are correct now).
   (a) $2.1 \times 1.2 = 2.52$
   (b) $9.7 \times 6.13 = 59.461$
   (c) $4.08 \times 1.2 = 4.096$
   (d) $0.196 \times 0.8 = 0.165$
   (e) $0.134 \times 4.2 = 0.5628$
   (f) $9.18 \times 1.98 = 18.1854$

8.3 Warm-up: Reading Tables

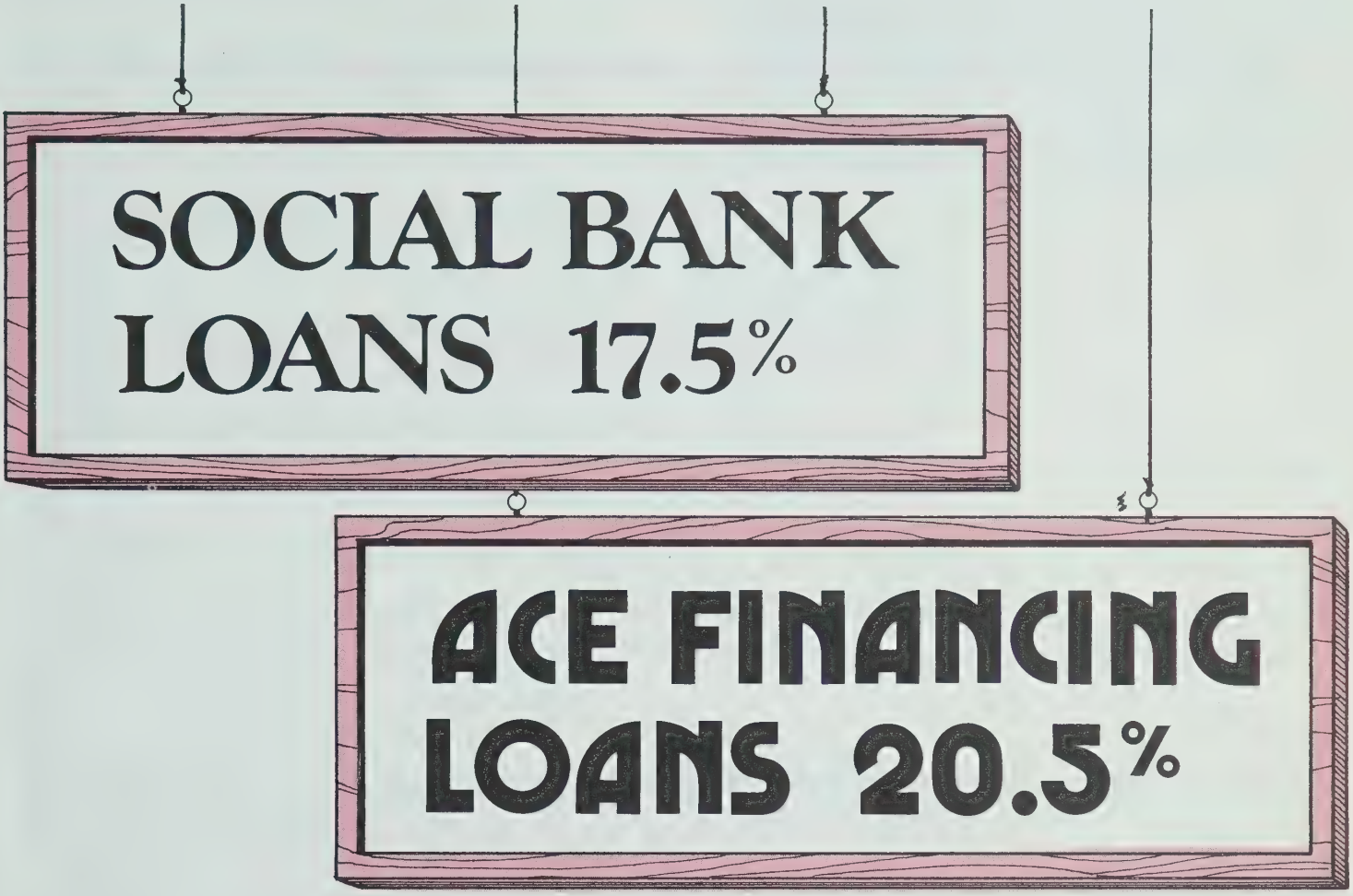
Refer to this table to give the information requested for the cars below.

Car	Engine Size	Cylinders	Transmission	Carburetor	Fuel	In Litres Per 100 km Fuel Consumption
Olds Cutlass	5.0	8	A3	4	X	11.0
Olds Omega	2.5	4	A3	2	X	8.8
Peugot 504SL	2.0	4	A3	2	R	11.5
Plymouth Volaré	3.7	6	M3	1	X	10.7
Pontiac Le Mans	3.8	6	M3	2	X	10.7
Ford Mustang	2.3	4	A3	2	X	9.1

(a) Pontiac Le Mans: engine size
(b) Olds Omega: fuel
(c) Peugot 504 SL: transmission
(d) Ford Mustang: fuel consumption (Litres per 100 km)
(e) Olds Cutlass: cylinders
(f) Plymouth Volaré: carburetor

8.4 Sources of Loans

If you need to buy something, and you don't have the money, a loan can help. A loan is an amount of money borrowed from an institution or a person. A person agrees to pay the loan back in monthly payments, or installments.



1. (a) Which institution pictured above gives a better interest deal?
   (b) Why might a bank be cheaper to borrow from than a loan company?
   (c) Why might a loan company charge a higher interest to borrow money?

2. Copy and complete this chart in your notebook.

	Item bought with a loan	Best place to borrow money from
(a)	car	bank
(b)	pants	
(c)	piano	
(d)	sail boat	
(e)	television	
(f)	fur coat	
(g)	stereo system	
(h)	home improvements	

Give reasons why you chose that particular loan institution for each item.

Math YOU Need

3. Many stores offer financing when an item is bought. Do you think this is better than going to a bank or loan company? Give reasons for your answer.

8.5 Loan Applications

Parts of basic loan applications look like this one. Use the loan application to answer the questions below.

NAME MR MISS MRS.
(PLEASE PRINT) GIVEN NAME SURNAME

ADDRESS (STREET)

P.O. (CITY/TOWN) POSTAL CODE

FIRM OR COMPANY (EMPLOYER) _____

ADDRESS _____

POSITION HELD _____

FORMER EMPLOYMENT _____ HOW LONG _____

RELATIVE OR CLOSE FRIEND NAME _____ RELATIONSHIP/OCCUPATION _____

ADDRESS _____

OTHER INCOME, IF ANY, SOURCE _____ AMOUNT YEARLY $ _____

DOES SPOUSE HAVE INCOME OR PROPERTY OF HIS/HER OWN? PLEASE GIVE PARTICULARS _____

PARTICULARS OF ANY REAL ESTATE HELD	YEAR PURCHASED	PRESENT FAIR VALUE	TAXES OWING
		$	$

PARTICULARS IF RENTING RENTAL $ _____ HOW LONG AT PRESENT ADDRESS? _____ HOME ☐ ROOM ☐ BOARDING ☐

LOANS AND DEBTS OWING

OWING TO		NAME	DATE INCURRED	ORIGINAL AMOUNT	UNPAID BALANCES
THIS OR OTHER BANKS				$	$
FINANCE COMPANIES OR CREDIT UNIONS					
INSTALMENT PURCHASES	AUTO				
	OTHER				
INCOME TAX AND OTHER DEBTS					

1. Why would the company want to know what the money is for?
2. Why would the applicant have to be employed?
3. Why would the company want to know about previous employers?
4. Why would the company want to know about other debts?
5. Most loan companies take information on things that the applicant owns (such as a car). These are called "chattels". The company can take these things if the applicant fails to repay the loan. Why would loan companies want information on an applicant's chattels?

Math YOU Need

6. Some applicants need a co-signer. The co-signer is a person who agrees to pay the loan if the applicant can't pay it back. What kind of applicant might need a co-signer?

8.6 Interest on Loans: Cost of Borrowing

Loans cost money. Most loans are repaid with interest.
For example, Amy borrowed $7000 at an interest rate of 16%/a. What was the cost of borrowing?

COST OF BORROWING = PRINCIPAL × RATE OF INTEREST
= $7000 × 16%
= $7000 × 0.16
= $1120

1. Calculate the costs of borrowing these amounts for 1 a.

	Principal	Rate of Interest	Cost of Borrowing
(a)	$6400	15%	$6400 × 0.15 = $960
(b)	$5600	12%	
(c)	$8200	18%	
(d)	$9600	17%	
(e)	$5350	16%	
(f)	$2100	14%	
(g)	$1850	15%	
(h)	$1900	13%	
(i)	$11 750	19%	
(j)	$12 800	21%	

2. Calculate the costs of borrowing these amounts for 1 a.

	Principal	Rate of Interest	Cost of Borrowing
(a)	$7100	16.5%	$7100 × 0.165 = $1171.50
(b)	$8350	12.8%	
(c)	$9500	17.9%	
(d)	$6450	17.75%	
(e)	$8790	16.65%	
(f)	$2185	18.5%	
(g)	$1780	12.8%	
(h)	$9680	14.25%	

3. Calculate the amount to be repaid for these loans after 1a.

	Principal	Rate of Interest	Cost of Borrowing	Amount to be repaid
(a)	$8400	17%	$8400 × 0.17 = $1428	$8400 + $1428 = $9828
(b)	$9700	18%		
(c)	$2000	19%		
(d)	$4500	19.5%		
(e)	$5100	16.75%		
(f)	$7200	24%		
(g)	$6600	22%		
(h)	$9300	12%		

Math YOU Need

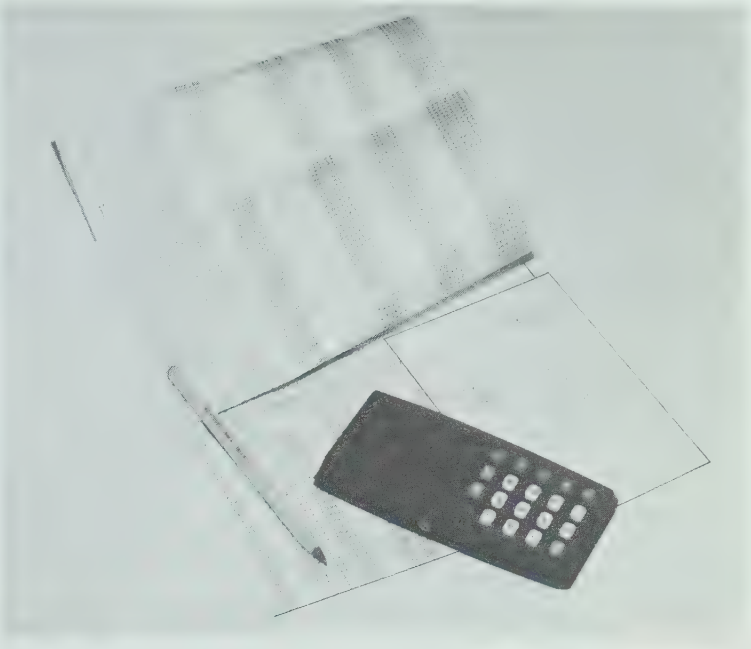
4. If you borrowed $9500 at 22.5%/a, how much would you have to repay?
   - $18 478.75
   - $11 637.50
   - $14 321.50

8.7 Amortization Tables

Bank and loan companies use amortization tables, like the one on this page. You will use these tables in lessons 8.8 and 8.9.

Yearly Rate	6%	15%	18%	21%	24%	30%
Monthly Rate	$\frac{1}{2}$%	$1\frac{1}{4}$%	$1\frac{1}{2}$%	$1\frac{3}{4}$%	2%	$2\frac{1}{2}$%
Period						
16	0.065188	0.069347	0.070765	0.072199	0.073649	0.076599
17	0.061505	0.065660	0.067080	0.068516	0.069969	0.072927
18	0.058231	0.062385	0.063806	0.065244	0.066701	0.069670
19	0.055302	0.059455	0.060878	0.062320	0.063781	0.066780
20	0.052666	0.056820	0.058246	0.059691	0.061156	0.064147
21	0.050281	0.054437	0.055865	0.057314	0.058784	0.061787
22	0.048113	0.052272	0.053703	0.055156	0.056631	0.059646
23	0.046134	0.050296	0.051731	0.053187	0.054667	0.057696
24	0.044320	0.048486	0.049924	0.051385	0.052871	0.055912
25	0.042651	0.046822	0.048263	0.049729	0.051220	0.054276
26	0.041111	0.045287	0.046732	0.048202	0.049699	0.052768
27	0.039685	0.043866	0.045315	0.046790	0.048293	0.051376
28	0.038361	0.042548	0.044001	0.045481	0.046989	0.050088
29	0.037129	0.041322	0.042778	0.044264	0.045778	0.048891
30	0.035978	0.040178	0.041639	0.043129	0.044649	0.047777
31	0.034903	0.039109	0.040574	0.042069	0.043596	0.046739
32	0.033894	0.038107	0.039577	0.041078	0.042610	0.045768
33	0.032947	0.037167	0.038641	0.040147	0.041686	0.044859
34	0.032055	0.036283	0.037761	0.039273	0.040818	0.044006
35	0.031215	0.035451	0.036933	0.038450	0.040002	0.043205
36	0.030421	0.034665	0.036152	0.037675	0.039232	0.042451
37	0.029671	0.033922	0.035414	0.036942	0.038506	0.041740
38	0.028960	0.033219	0.034716	0.036249	0.037820	0.041070
39	0.028286	0.032553	0.034054	0.035593	0.037171	0.040436
40	0.027645	0.031921	0.033427	0.034972	0.036555	0.039836
41	0.027036	0.031320	0.032831	0.034381	0.035971	0.039267
42	0.026456	0.030749	0.032264	0.033620	0.035417	0.038728
43	0.025903	0.030204	0.031724	0.033286	0.034889	0.038216
44	0.025375	0.029685	0.031210	0.032778	0.034387	0.037730
45	0.024871	0.029190	0.030719	0.032293	0.033909	0.037267
46	0.024389	0.028716	0.030251	0.031830	0.033453	0.036826
47	0.023927	0.028264	0.029803	0.031388	0.033017	0.036406
48	0.023485	0.027830	0.029375	0.030965	0.032601	0.036006
49	0.023060	0.027415	0.028964	0.030561	0.032203	0.035623
50	0.022653	0.027017	0.028571	0.030173	0.031823	0.035258
51	0.022262	0.026635	0.028194	0.029802	0.031458	0.034908
52	0.021866	0.026265	0.027532	0.029446	0.031109	0.034574
53	0.021525	0.025916	0.027485	0.029104	0.030773	0.034254
54	0.021176	0.025577	0.027151	0.028776	0.030452	0.033948
55	0.020841	0.025251	0.026830	0.028461	0.030143	0.033654
56	0.020518	0.024937	0.026521	0.028157	0.029846	0.033372
57	0.020206	0.024634	0.026223	0.027866	0.029561	0.033102
58	0.019904	0.024343	0.025936	0.027585	0.029286	0.032842
59	0.019614	0.024061	0.025660	0.027314	0.029022	0.032593
60	0.019332	0.023789	0.025393	0.027053	0.028767	0.032353

8.8 Monthly Payments



*You will use information from the amortization tables in 8.7 for this page.

Loans are paid back in monthly payments.
Monthly payments depend on
- the size of the loan
- the rate of interest
- the number of months to repay the loan.

The amortization tables in 8.7 tell the amount of interest paid on $1 of the loan.
Interest is calculated on a monthly basis.

For example: $18\%/a = \frac{18}{12}\%$ per month $= 1\frac{1}{2}\%$ per month.

John had a $2000 loan. He wished to repay the loan over 3 a (3 a × 12 months = 36 months).

The loan was at 18%/a (or $1\frac{1}{2}\%$ per month).

How much were his monthly payments?

MONTHLY PAYMENT = PRINCIPAL × AMORTIZATION TABLE FIGURE

= $2000 × $0.036152 ← from table: $1\frac{1}{2}\%$, 36 months

= $72.30 per month

1. Read the amounts (for the loan of $1.00) from the amortization table for these repayment periods and interest rates.

	Repayment Period (months)	Interest Per Year	Interest Per Month	Amortization Table Reading
(a)	24	21%	$\frac{21}{12} = 1\frac{3}{4}\%$	$0.051385
(b)	28	15%		
(c)	36	18%		
(d)	30	6%		
(e)	42	30%		
(f)	60	21%		
(g)	48	18%		
(h)	58	6%		

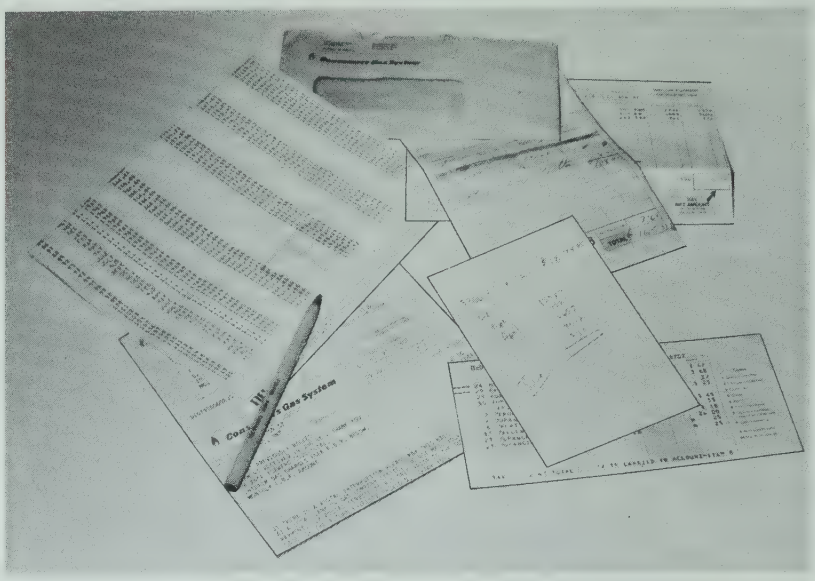
2. Calculate the monthly payments for these loans.

	Principal	Repayment in Months	Rate of Interest Per Year	Rate of Interest Per Month	Amortization Table Reading	Monthly Payment
(a)	$7600	48	18%	$\frac{18}{12}\% = 1\frac{1}{2}\%$	$0.029375	$7600 × $0.029375 = $223.25
(b)	$4300	60	24%			
(c)	$5500	36	21%			
(d)	$6100	24	6%			
(e)	$4850	35	18%			
(f)	$8100	47	21%			

Math YOU Need

3. John can afford payments of $150 per month. Could he borrow $5800 at 18%/a, repayable in 48 months? Give a reason.

8.9 Amortization Schedule



*You will use information from the amortization tables in 8.7 for this page.
An amortization schedule (or loan repaying schedule) can be drawn up once the monthly payment is known.
This shows how much money goes to pay off principal and interest from each payment.

For Example, Harry has a loan of $5000 at 18%/a to be paid back in equal installments over 60 months. What will be his

(a) monthly payment?
(b) first month's interest payment?
(c) first month's principal payment?

(a) MONTHLY PAYMENT = PRINCIPAL × AMORTIZATION TABLE FIGURE

$= \$5000 \times \$0.025393$ ← from table: $1\frac{1}{2}\%$ per month for 60 months

$= \$126.97$

(b) MONTHLY INTEREST = PRINCIPAL × RATE OF INTEREST × $\frac{1}{12}$

$= \$5000 \times 18\% \times \frac{1}{12}$

$= \$5000 \times \frac{18}{100} \times \frac{1}{12}$

$= \$75$

(c) PRINCIPAL REPAID = MONTHLY PAYMENT − MONTHLY INTEREST

$= \$126.97 - \$75$

$= \$51.97$

1. Calculate Harry's amortization schedule for 10 payments.

AMORTIZATION SCHEDULE FOR Harry Filbert
LOAN AMOUNT: $5000 at 18%/a, 60 months, $126.97 per month

	Payment Number	Interest	Amount of Principal Repaid	Unpaid Balance
(a)	1	$\$5000 \times 18\% \times \frac{1}{12}$ $= \$75.00$	$\$126.97 - \$75 = \$51.97$	$\$5000 - \$51.97$ $= \$4948.03$
(b)	2	$\$4948.03 \times 18\% \times \frac{1}{12}$ $= \$74.22$	$\$126.97 - \$74.22 =$ _____	
(c)	3			
(d)	4			
(e)	5			
(f)	6			
(g)	7			
(h)	8			
(i)	9			
(j)	10			

Math YOU Need

2. Sue has a loan that is $2600 less than Harry's loan, yet her monthly payment is only $3.65 less. Give reasons why their monthly payments are so close.

8.10 Mortgages

Mortgages are loans given to people who buy real estate. A mortgage lender may reclaim the property if the mortgage is not repaid.

PARTICULARS OF LAND AND BUILDING

AGE OF HOUSE	LOT NO(S)	BLOCK NO(S)	PLAN NO
YEARS			

LOT SIZE	COUNTY/DISTRICT	TWP /PARISH/RURAL MUNICIPALITY	CITY/TOWN/VILLAGE	PROVINCE
X				

ADDRESS OR OTHER IDENTIFICATION

TENURE: ☐ FREEHOLD ☐ LEASE-HOLD ☐ OTHER (Specify)

SERVICES (INDICATE BY (✓) AS APPL.)	YES	NO
SAN SEWER	1	2
STORM SEWER	1	2
COMBINED SEWER	1	2
WATER	1	2
CURBS	1	2
PAVED ROADS	1	2
SIDE WALKS	1	2
WELL	1	2
SEPTIC TANK	1	2

SERVICES ARE PAID: IN FULL 1 | BY LOCAL IMPROVEMENTS 2 | PARTLY BOTH 3

PRESENT ANNUAL TAXES	EST. AFTER IMPROVEMENTS
$	$

LOAN APPLIED FOR

AMOUNT (Exclude Mortgage Insurance Fee) $

TERM YRS | AMORTIZATION PERIOD YEARS

I WISH TO CORRESPOND IN:
- ☐ Advanced as Work Progresses
- ☐ Paid Following Completion
- ☐ One Sum paid on Refinancing/Purchase

PARTICULARS OF APPLICANT(S)

AGE | MARITAL STATUS (Indicate (✓) as applicable)

Yrs | 1 Single | 2 Married | 3 Widow | 4 Widower | 5 Divorced

NO. OF DEPENDENTS (Exclude Wife): Children | Other

DO YOU OWN PRESENT DWELLING? (Indicate (✓)): 1 No | 2 Yes

IF YES, WILL IT BE SOLD? (Indicate (✓)): No | Yes

PRESENT ANNUAL RENT (To Nearest Dollar): $

2 Heat Only | 3 Water Only | 4 Heat and Water | 5 Electricity | 6 Heat Water Elect | 7 Board | 8 Furnished

ANNUAL FAMILY INCOME (Nearest Dollar)

APPLICANT	Salary Wages Commission	$
	Other Income	$
	TOTAL	$
CO-APPLICANT	Salary Wages Commission	$
FAMILY AND YOUTH ALLOWANCES		$
	FAMILY TOTAL	$

	APPLICANT	CO-APPLICANT
EMPLOYER'S NAME AND ADDRESS		
TYPE OF BUSINESS		
POSITION HELD		
YEARS WITH FIRM		
SOURCE OF ANY ADDITIONAL INCOME		
PREVIOUS EMPLOYER		
YEARS WITH FIRM		
PREVIOUS ANNUAL SALARY	$	$

REFERENCES

BANK NAME AND ADDRESS

LANDLORD OR MORTGAGEE NAME AND ADDRESS

OTHER REFERENCES NAME AND ADDRESS

1. Compare the information on the above mortgage form with the loan application form in lesson 8.5.
   (a) In which areas will the information be the same?
   (b) In which areas will the information be different?
2. Give reasons why a mortgage lender would want to know about an applicant's previous employer.
3. "References" are people or institutions that give information on the applicant. Give reasons why the mortgage lender would want references.
4. Some people insure their mortgages. Give reasons why they might want their mortgages to be insured.
5. Who might the co-applicant be?

Math YOU Need

6. Which is harder to get: a mortgage or a loan? Give a reason for your answer.

8.11 Costs of Mortgages

Mortgages are amortized in much the same way as a personal loan. The major difference is that mortgages are amortized over longer periods of time: 20 a, 25 a, 30 a, etc.

For example, a mortgage of $27 000 at 12% carries for a monthly payment of $300. Calculate

(a) the first month's interest payment

(b) the first month's principal payment

(a) MONTHLY INTEREST = PRINCIPAL × RATE × $\frac{1}{12}$

$= \$27\,000 \times 12\% \times \frac{1}{12}$

$= \$3240 \times \frac{1}{12}$

$= \$270$

(b) MONTHLY PRINCIPAL = MONTHLY PAYMENT − MONTHLY INTEREST

$= \$300 - \$270$

$= \$30$

1. Copy and complete this chart for 12 payments on a $27 000 mortgage at 17%, with a monthly payment of $500.

	Payment	Monthly Interest	Monthly Principal	Unpaid Balance
(a)	1	$\$27\,000 \times 17\% \times \frac{1}{12}$ $= \$382.50$	$\$500 - \$382.50$ $= \$117.50$	$\$27\,000 - \$117.50$ $= \$26\,882.50$
(b)	2	$\$26\,882.50 \times 17\% \times \frac{1}{12}$ $=$ _____		
(c)	3			
(d)	4			
(e)	5			
(f)	6			
(g)	7			
(h)	8			
(i)	9			
(j)	10			
(k)	11			
(l)	12			

2. Copy and complete this chart for the same $27 000 mortgage at 17%, with a monthly payment of $400.

	Payment	Monthly Interest	Monthly Principal	Unpaid Balance
(a)	1			
(b)	2			
(c)	3			
(d)	4			
(e)	5			
(f)	6			

Math YOU Need

3. Is it better to pay a larger monthly payment than what is asked for? Give a reason for your answer.

8.12 Credit Cards

Credit cards are used when you purchase items now, then agree to pay for them later. It is another form of a loan. Interest with credit cards usually is set at 18% (or higher) and calculated monthly.

No interest is charged if the full amount of the credit card statement is paid off in one month. Otherwise, monthly payments can be made until the balance is paid off.

CANADA CREDIT APPLICATION FORM

LAST NAME	FIRST NAME	INITIALS	HOME TELEPHONE NO.	SOCIAL INSURANCE NO.

NO. AND STREET NAME (SPECIFY ST., AVE., RD., ETC.)	APT. NO.	☐ SINGLE ☐ SEPARATED ☐ MARRIED ☐ DIVORCED ☐ WIDOW(ER)	DATE OF BIRTH MONTH DAY YEAR	SPOUSE (FIRST NAME)

CITY	PROVINCE	POSTAL CODE	AT PRESENT ADDRESS ☐ OWN ☐ RENT ☐ WITH PARENTS	DRIVER'S LICENSE NO.

PREVIOUS ADDRESS (IF AT PRESENT ADDRESS LESS THAN 2 a)	HOW LONG ?

EMPLOYER – NAME AND ADDRESS	TELEPHONE	OCCUPATION	HOW LONG ?	GROSS MONTHLY INCOME $
PREVIOUS EMPLOYER (IF WITH ABOVE LESS THAN 2 a)	TELEPHONE	OCCUPATION	HOW LONG ?	GROSS MONTHLY INCOME $
SPOUSE NOW EMPLOYED BY – NAME AND ADDRESS	TELEPHONE	OCCUPATION	HOW LONG ?	GROSS MONTHLY INCOME $

NAME AND ADDRESS OF NEAREST RELATIVE NOT LIVING WITH ME	RELATIONSHIP

REFERENCES					
BANK	BRANCH	☐ LOAN $ ☐ SAVINGS ACCT. NO.			☐ PCA NO. ☐ C/A NO.
HOME: FINANCED BY		$ ESTIMATED VALUE	$ AMOUNT OWING	$ MONTHLY PAYMENT	
AUTO: YEAR AND MAKE	FINANCED BY	$	$	$	

OTHER LOANS, (CREDIT CARDS, DEPT. STORES, FINANCE CO'S. ETC.)			
NAME ADDRESS	$ AMOUNT OWING	$ MONTHLY PAYMENT	
NAME ADDRESS	$	$	
NAME ADDRESS	$ AMOUNT OWING	$ MONTHLY PAYMENT	
NAME ADDRESS	$	$	

The Applicant hereby certifies the above information to be true and, if this application is accepted, requests Canada Credit card(s) be issued and renewals or replacements thereof from time to time. In connection with such issuance, renewal or replacement, the Applicant authorizes and consents to the receipt and exchange of credit information. The Applicant agrees to be bound by the terms of the issuing Bank's Cardholder's Agreement and to be liable for any indebtedness incurred on cards issued in any alternate name designated below. Use of any such card shall evidence receipt of such Cardholder's Agreement.

PLEASE ISSUE AN ADDITIONAL CARD ☐ IN MY OWN NAME ☐ OTHER FAMILY MEMBER WITH THE SAME SURNAME FIRST NAME _____ INITIALS _____

DATE _____ APPLICANT'S SIGNATURE X _____

The following questions refer to the above application form.

1. Why must the applicant be employed?
2. Why would the credit card company want to know about other loans?
3. Why would the credit card company want to know how much the applicant earns?

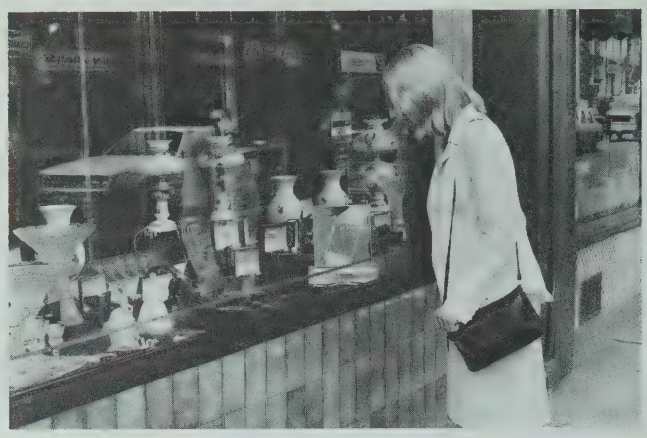
These questions deal with credit cards in general.

4. List some advantages of having a credit card.
5. List some disadvantages of having a credit card.

Math YOU Need

6. Many people think that a credit card shouldn't be used if you can't afford an item with cash. Do you agree or disagree with this? Give reasons for your answer.

8.13 Monthly Statements



Credit card companies send monthly statements to credit card holders. This gives a record of all the purchases made that month. It also records any payments made. The new balance is given and also the minimum payment required.

1. For the monthly statement below, calculate
   (a) the total cost of purchases (charges);
   (b) the present balance.

DATE M D	REFERENCE NO. REFERENCE NO.	TRANSACTION DESCRIPTION DESCRIPTION DE LA TRANSACTION	CHARGES/CREDITS ACHATS/CREDITS	
		GIRLS PANT	8.99	
		GRL TOP/PANT	9.99	
		CORD PANT	8.99	
		SOCCER SHIRT	6.99	
		BOYS SHIRT	5.99	
		JEAN	12.98	
		BOYS JACKET	6.99	
		DENIM JEAN	9.99	
		FABRICSOFTN	1.99	
0814	8777273	TOTAL ORDER TAX	.52	
0814		PAYMENT—THANK YOU		80.36–

ACCOUNT NUMBER	PREVIOUS BALANCE	CREDIT CHARGE	CHARGES	CREDITS	PRESENT BALANCE	AMOUNT DUE
	80.36	+ NIL +		– 80.36	=	
NUMERO DE COMPTE	SOLDE PERCEDENT	COÛT DE CREDIT	ACHATS	CREDITS	SOLDE ACTUEL	MONTANT DU

Question 2 refers to the statement below.

Previous balance: $359.75	Payments: July 2 $159.75
PURCHASES	
July 3 gas	$11.50
7 pants	$17.95
8 shirt	$11.50
10 gas	$12.75
14 tennis	
racquet	$21.95
17 golf balls	$17.49
TOTAL PURCHASES	
CREDITS: Payment:	$159.75
Return tennis racquet:	21.95

2. (a) Calculate the total purchases.
   (b) Calculate the total credits.
   (c) Add the previous balance to the total purchases.
   (d) Subtract the total credit from the figure in (c) to get the new balance.
   (e) Calculate the interest on the new balance (18%/a, calculated monthly at $1\frac{1}{2}\%$).

Math YOU Need

3. Dianne bought a stereo with her credit card for $600. She knew that interest would be 18%/a, but she planned to pay off the entire amount when the first monthly statement arrived. Unfortunately, her payment arrived late and she was charged 1 month's interest. How much interest was she charged?

8.14 Travellers' Cheques

Travellers' cheques are usually purchased by tourists. They are used instead of cash. If they are lost or stolen, the tourist can get new ones at a bank or other institution.

A service charge of 1% or more of the total value of the travellers' cheques is sometimes made.

For example, Susan purchased $650 in travellers' cheques. The bank made a service charge of 1%. What did she have to pay in total for the cheques?

TOTAL COST = PRINCIPAL + (PRINCIPAL × SERVICE CHARGE RATE)
= $650 + ($650 × 1%)
= $650 + $6.50
= $656.50

1. Calculate the total cost for these travellers' cheques.

	Cheques' Amounts	Service Charge Rate	Service Charge	Total Cost
(a)	$850	1%	$850 × 1% = $8.50	$850 + $8.50 = $858.50
(b)	$910	1%		
(c)	$759	1%		
(d)	$1240	1%		
(e)	$1485	1.5%		
(f)	$2665	1.75%		
(g)	$1780	1.3%		
(h)	$1435	1%		
(i)	$1570	1.8%		
(j)	$2614	1.9%		

2. Find the amount spent on this purchase of travellers' cheques (plus a 1% service charge).

THOMPSON Travellers Cheques — Sales Advice
Avis de Vente

Selling Agent/Agent-Vendeur

Full Name of Customer
Nom et prénom du client

Address
Addresse

IMPORTANT Each cheque must be signed on receipt in the space Signature of Holder at the bottom of the Cheque and only countersigned in the presence of the paying Agent at the time of encashment. Any loss arising from the non-observance of this precaution will fall on the holder. I have read and agree to those conditions.

Signature of holder and date
Signature du titulaire et date

Day Jour | Month Mois | 19 Year Année

Pre-fix	Cheques Numbered/Numéros des chèques From / De	To / Jusqu'à

COPY/COPIE 2

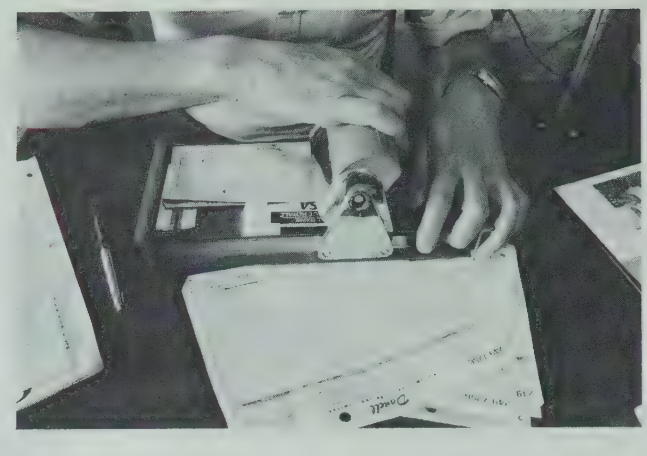
Selling Agent's copy
Copie de l'Agent-Vendeur

Quantity Quantité	Denom. Coupure	Amount Montant
	CAN $20	
	CAN $50	
	CAN $100	
Total Sale Total Vente	CAN $	
Commission	CAN $	
Total Collected Total Reçu	CAN $	
Rate Cours	=	

Thompson Canada Ltd.

3. Art paid $2343 for $2300 worth of travellers' cheques. His bank charged a 1% service fee. Was he overcharged?

8.15 Think About It: Credit Card Payments



On this page, you should get an idea of how much it costs to use a credit card.
Credit card companies calculate monthly payments using monthly interest.
For example, Dave had a credit card balance of $759. Interest was set at 21%/a.
What was

(a) the monthly interest rate?

(b) the monthly interest payments?

(a) MONTHLY INTEREST RATE = YEARLY INTEREST RATE ÷ 12
= 21% ÷ 12
= 1.75%

(b) MONTHLY INTEREST PAYMENT = PRINCIPAL × MONTHLY INTEREST RATE
= $759 × 1.75%
= $13.28

Monthly payments are usually set at 5% of the principal. What would Dave's monthly payment be?

MONTHLY PAYMENT = PRINCIPAL × RATE OF PAYMENT
= $759 × 5%
= $759 × 0.05
= $37.95

1. Calculate Dave's next eight monthly payments on his credit card balance.

	Payment Number	Principal	Monthly Interest	Monthly Payment	Monthly Principal Payment	Unpaid Balance
(a)	1	$759	$759 × 1.75% = $13.28	$759 × 5% = $37.95	$37.95 − $13.28 = $24.67	$759 − $24.67 = $734.33
(b)	2	$734.33	$734.33 × 1.75% =	$734.33 × 5% =		
(c)	3					
(d)	4					
(e)	5					
(f)	6					
(g)	7					
(h)	8					

2. Complete this information for a credit card balance of $1300 at 24%/a.

	Payment Number	Principal	Monthly Interest	Monthly Payment	Monthly Principal Payment	Unpaid Balance
(a)	1	$1300				
(b)	2					
(c)	3					
(d)	4					
(e)	5					
(f)	6					
(g)	7					
(h)	8					
(i)	9					
(j)	10					

(k) What is the balance after 10 payments?

(l) How much money was paid in interest altogether?

(m) How could the balance be paid off quicker?

8.16 Test Run

UNIT 8 REVIEW TEST

How much do you remember about loans and credits? Try this test and see!

1. Copy and complete this chart for 6 payments on a $42 000 mortgage at 16%, with a monthly payment of $585 (principal and interest).

	Payment	Monthly Interest	Monthly Payment	Unpaid Balance
(a)	1	$42 000 × 16% × $\frac{1}{12}$ =	$585	
(b)	2			
(c)	3			
(d)	4			
(e)	5			
(f)	6			

2. Calculate how much these purchases really cost (they were all bought with credit cards).
   - (a) boots: $49, 18%/a, 3 months to pay off
   - (b) T.V: $790, 21%/a, 6 months to pay off
   - (c) sofa: $1200, 24%/a, 8 months to pay off

UNIT 9 PREVIEW TEST

You'll need these skills for Unit 9.
- basic facts with decimal fractions
- multiplication, division with 1000, 100, 10, 0.1, 0.01

Try these. How many can you do in your head?

1. Add.
   (a) 6.8 + 7.2 + 3.9
   (b) 2.54 + 8.13 + 9.761
   (c) 3.51 + 74.6 + 9.51

2. Subtract.
   (a) 21.065 − 1.819
   (b) 3.764 − 3.659
   (c) 84.157 − 83.796

3. Multiply.
   (a) 6.8 × 3.9 =
   (b) 5.1 × 1.5 =
   (c) 2.8 × 8.4 =

4. Divide.
   (a) 6.8 ÷ 4 =
   (b) 2.4 ÷ 0.6 =
   (c) 4.8 ÷ 1.2 =

5. Multiply.
   (a) 98 × 1000 =
   (b) 64 × 0.1 =
   (c) 89.3 × 10 =

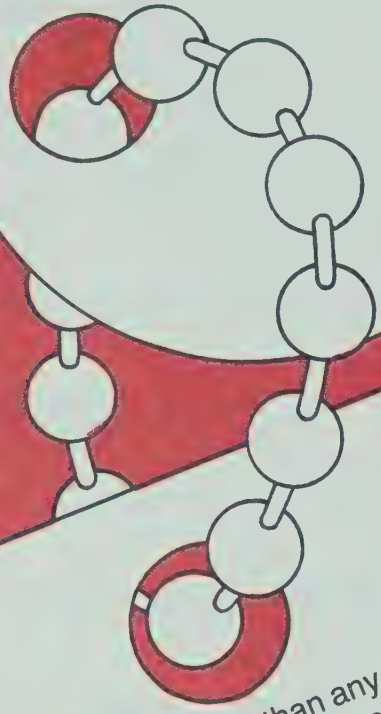
6. Divide.
   (a) 87 ÷ 100 =
   (b) 95 ÷ 0.01 =
   (c) 6.5 ÷ 1000 =

TAKE-A-BREAK: MULTIPLICATION OF DECIMAL FRACTIONS

A "palindromic" number is read the same frontwards as backwards.
For example,
141 ←You can read this starting from the left (frontwards) or starting from the right (backwards). The number reads the same both ways.
1946←This number doesn't read the same frontwards and backwards.
You'll find one palindromic answer in these questions. Try to be the first to get it!

4.3 × 8.1	9.12 × 4.8	7.7 × 8.8	34.6 × 9.8	6.6 × 5.4

Make up some more palindromic numbers.



UNIT 9
Insurance

Canadians buy more insurance than any other people in the world. Although this unit won't tell you why, it will help you understand what insurance is.
(Why do *you* think Canadians buy so much insurance?)

9.1 Warm-up: Basic Facts with Decimal Fractions
9.2 Warm-up: Reading Tables
9.3 Warm-up: Multiplication, Division, 1000, 100, 10, 0.1, 0.01, 0.001
9.4 Insuring Your Car
9.5 Influence on Rates
9.6 Insurance Terms
9.7 Comparing Costs
9.8 Checking Rates
9.9 Insurance Risks
9.10 Life Insurance
9.11 Table of Mortality
9.12 Calculating Premiums
9.13 Cash Surrender Values
9.14 Home Insurance
9.15 Calculating Fire Insurance Rates
9.16 True-value Replacement
9.17 Think About It: Annual and Periodic Premium Payments
9.18 Test Run: Unit 9 Review Test — Take-a-Break

Try Warm-ups 9.1, 9.2 and 9.3 before you work on the unit. They'll get you ready to deal with insurance!

9.1 Warm-up: Basic Facts with Decimal Fractions

1. Add.
   (a) 3.113 + 2.8 =
   (b) 0.128 + 0.9082 =
   (c) 7.6 + 81.45 =
   (d) 9.89 + 9.01 =

2. Subtract.
   (a) 21.3 − 18.9 =
   (b) 64.5 − 25.76 =
   (c) 9.13 − 8.14 =
   (d) 5.01 − 5.001 =

3. Multiply.
   (a) 3.8 × 1.1 =
   (b) 2.2 × 5.5 =
   (c) 6.1 × 1.6 =
   (d) 3.01 × 0.12 =

4. Divide.
   (a) 2.5 ÷ 0.5 =
   (b) 6.8 ÷ 1.2 =
   (c) 9.3 ÷ 0.3 =
   (d) 1.82 ÷ 0.04 =

9.2 Warm-up: Reading Tables

Use this table to give the information requested below.

Average Television Viewing Time Per Week

		Total	Mon-Fri 10:00-16:30	Mon-Fri 16:30-19:30	Mon-Sat 20:00-23:00 Sun 19:00-23:00	Sat-Sun 07:00-13:00	Sat. 13:00-20:00 Sun. 13:00-19:00	Mon-Sun 23:00-01:00	All other times
Avg. age of all persons		30 h 25 min	4 h 57 min	4 h 57 min	10 h 2 min	1 h 13 min	3 h 21 min	2 h 44 min	3 h 21 min
Women	18-24	32 h 53 min	6 h 54 min	4 h 56 min	10 h 31 min	1 h 19 min	3 h 17 min	2 h 58 min	2 h 58 min
	25-54	33 h 54 min	6 h 26 min	4 h 24 min	11 h 52 min	41 min	3 h 3 min	3 h 44 min	3 h 44 min
	55+	37 h 55 min	7 h 58 min	6 h 27 min	11 h 45 min	1 h 8 min	3 h 25 min	3 h 2 min	4 h 10 min
Men	18-24	23 h 32 min	2 h 35 min	3 h 18 min	7 h 46 min	56 min	3 h 4 min	2 h 49 min	3 h 4 min
	25-54	26 h 42 min	2 h 8 min	3 h 28 min	10 h 25 min	48 min	3 h 45 min	3 h 12 min	2 h 56 min
	55+	33 h 38 min	4 h 42 min	5 h 43 min	11 h 26 min	1 h 1 min	4 h 22 min	3 h 2 min	3 h 22 min
Teens	Female	23 h 25 min	3 h 45 min	4 h 13 min	8 h 26min	1 h 10 min	2 h 35 min	1 h 24 min	1 h 52 min
	Male	27 h 12 min	3 h 16 min	4 h 37 min	9 h 15 min	1 h 54 min	3 h 32 min	2 h 11 min	2 h 27 min
Children	2-5	31 h 23 min	6 h 35 min	6 h 17 min	6 h 35 min	3 h 46 min	3 h 8 min	38 min	4 h 24 min
	6-11	27 h 16 min	3 h 16 min	6 h	8 h 27 min	3 h	3 h	49 min	2 h 44 min

Source: A.C. Nielsen Co. of Canada Ltd.

1. Women, 18-24, Mon. — Fri. 16:30 to 19:30 = 4 h 56 min
2. Men, 55+, Mon. — Sat., 20:00 to 23:00 =
3. Teens, female, total =
4. Children, 2-5, all other times =
5. Women, 25-54, Sat. — Sun., 07:00 to 13:00 =

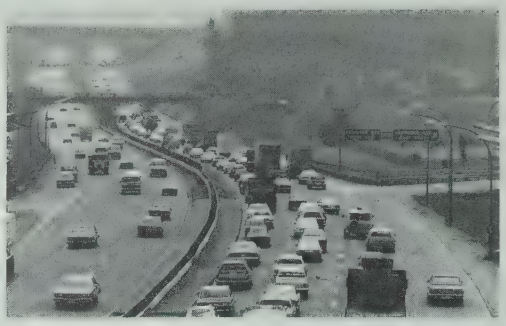
9.3 Warm-up: Multiplication, Division, 1000, 100, 10, 0.1, 0.01, 0.001

1. Multiply.
   (a) 6 × 1000 =
   (b) 74 × 10 =
   (c) 83 × 100 =
   (d) 65 × 0.1 =
   (e) 9.4 × 10 =
   (f) 8.32 × 0.01 =
   (g) 7.13 × 0.001 =
   (h) 0.12 × 1000 =
   (i) 6.546 × 10 =

2. Divide.
   (a) 68 ÷ 10 =
   (b) 97 ÷ 1000 =
   (c) 43 ÷ 1000 =
   (d) 8.5 ÷ 0.1 =
   (e) 9.32 ÷ 10 =
   (f) 85.6 ÷ 0.01 =
   (g) 6.55 ÷ 1000 =
   (h) 0.128 ÷ 0.001 =
   (i) 8.459 ÷ 0.01 =

9.4 Insuring Your Car

Having car insurance is as important as knowing how to drive. In most areas of Canada, cars are not allowed to be driven unless some form of insurance is purchased by the driver.
Refer to this form to answer the questions below.



YOUR LIABILITY CERTIFICATE

PLEASE HAVE WITH YOU WHEN REPORTING A CLAIM OR INQUIRING AT A SERVICE OFFICE.
SEE REVERSE SIDE - VOIR AU VERSO
THIS LIABILITY CERTIFICATE IS VALID ONLY WHEN PREMIUM IS PAID

INSURED VEHICLE - YEAR, MAKE, SERIAL NO. VÉHICULE ASSURÉ - ANNÉE, MARQUE, SÉRIE
NAME AND ADDRESS OF INSURED NOM ET ADRESSE DE L'ASSURÉ

69 Dodge Coronet 1987734-55-0

POLICY NUMBER - POLICE NUMÉRO

40-179645-32

MOTOR VEHICLE LIABILITY INSURANCE CARD
CANADA INTER-PROVINCE
CERTIFICAT D'ASSURANCE AUTOMOBILE RESPONSABILITE

EFFECTIVE DATE	DATE D'ENTRÉE	EN VIGUEUR	DATE OF EXPIRY	DATE D'EXPIRATION	
DAY JOUR	MO. MOIS	YEAR ANNÉE	DAY JOUR	MO. MOIS	YEAR ANNÉE
02	02	80	02	08	80

A LEGAL LIABILITY FOR BODILY INJURY TO OR DEATH OF ANY PERSON OR DAMAGE TO PROPERTY (EXCLUSIVE OF INTEREST & COSTS) $ 500 000

CAR INSURANCE PREMIUM $ 140

B. ACCIDENT BENEFIT SEE BACK OF YOUR RECORD COPY

ACCIDENT BENEFITS	MEDICAL & REHABILITATION	DEATH PRINCIPAL SUM	TOTAL DISABILITY MAXIMUM PER WEEK	UNINSURED MOTORIST	INCLUDED IN SECTION A PREMIUM
$ 25 000		$ 10 000	$ 143		

SUPPLEMENTARY ACCIDENT COVERAGE — ACCIDENTAL DEATH & IMPAIRMENT (AD & I) UP TO $20,000 — 2

C.
LOSS OF OR DAMAGE TO INSURED AUTOMOBILE — COMPREHENSIVE (FIRE OR THEFT OF THE ENTIRE AUTOMOBILE - NO DEDUCTIBLE) — DEDUCTIBLE $ / DEDUCTIBLE $

+CLAIM FEES +POLICY FEE SUSPENSION CREDIT ADJUSTMENTS +REINSTATEMENT FEE

TOTAL PREMIUM PAY 142

1. What is the total premium for car insurance only?

2. $500 000 is set aside for "public liability". This is money that may have to be paid to a person injured by the driver. Why is it a good idea to have this kind of coverage?

3. What amount could be paid per week to an injured driver?

4. Would this driver be insured on July 3, 1980?

5. Comprehensive insurance covers the driver's car. Why might this driver not have this kind of coverage?

Math YOU Need

6. Ted's insurance premiums went up 30%. What might have caused his premiums to increase?

9.5 Influence on Rates

What people spend on insurance (premiums) depends on their coverage. There are many factors controlling the premium.

1. Copy and complete this chart on factors affecting insurance rates.

	Factor	Makes Rates go up	Makes Rates go down	Reasons Why
(a)	area where car is driven, (few accidents)		X	areas with few auto accidents have low rates
(b)	area where car is driven (many accidents)	X		
(c)	age of car — old		X	
(d)	age of car — new	X		
(e)	value of car	X		
(f)	engine size — small		X	
(g)	engine size — large	X		
(h)	options — few		X	
(i)	options — many	X		
(j)	age of driver — over 25		X	
(k)	age of driver — under 25	X		
(l)	car use — business	X		
(m)	car use — pleasure		X	
(n)	car use — to and from work (depends on distance)	X	X	
(o)	driver's accidents	X		
(p)	driver's traffic violation	X		
(q)	driver-training certificate		X	

Math YOU Need

2. People under 25 a have to pay more for insurance. Is this fair? Give reasons for your answer.

9.6 Insurance Terms

It's a good idea to know the meaning of the terms used in insurance policies. This page will help.

Automobile insurance is divided into these two categories:

Protection for Others (PLPD)
- Public Liability (PL)
- Property Damage (PD)
- Third Party Liability

Protection for the Owner
- Medical
- Collision
- Comprehensive

These terms are defined as:

PUBLIC LIABILITY	protects owner against claims made on behalf of people killed or injured in an accident caused by insured car.
PROPERTY DAMAGE	protects owner against claims made by people whose property has been damaged by insured car.
MEDICAL	pays for medical or funeral expenses of someone travelling in insured car, if in an accident.
COLLISION	pays for damages to owner's car.
COMPREHENSIVE	pays for additional damage to owner's car, brought about by fire, water, theft, wind, and glass breakage.

1. Use these tables to calculate the yearly insurance premiums on the cars in the chart below.

Table 1 Full Comprehensive

Age of Car in Years	Compact	Mid-Size	Luxury
New, 1	$78	$122	$190
2-3	$61	$100	$148
4-5	$43	$71	$106
6, more	$35	$50	$85

Table 2 Collision. $50 deductible

Age of Car in Years	Compact	Mid-Size	Luxury
New, 1	$210	$290	$400
2-3	$173	$220	$301
4-5	$141	$196	$256
6, more	$126	$165	$217

Table 3 Collision. $100 deductible

Age of Car in Years	Compact	Mid-Size	Luxury
New, 1	$160	$230	$310
2-3	$123	$185	$229
4-5	$110	$148	$201
6, more	$99	$129	$170

	Type of Car	Comprehensive	Collision $50 Deductible	Collision $100 Deductible	Total Premiums $50	Total Premiums $100
(a)	new luxury	$190		$310	**$590**	**$500**
(b)	7 a old luxury					
(c)	3 a old compact					
(d)	1 a old mid-size					
(e)	5 a old luxury					
(f)	1 a old luxury					
(g)	new compact					

Math YOU Need

2. Bob bought a 1971 Dodge Charger. Should he get collision coverage for it? Give a reason for your answer.

9.7 Comparing Costs

Buying insurance is like other purchases. Comparing can help.

1. Use these tables to complete the chart below, comparing yearly insurance costs.

Table 1 Full Comprehensive

Age of Car in Years	Compact	Mid-Size	Luxury
New, 1	$78	$122	$190
2-3	$61	$100	$148
4-5	$43	$71	$106
6, more	$35	$50	$85

Table 2 Collision. $50 deductible

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New, 1	$210	$290	$400
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Table 3 Collision. $100 deductible

Age of Car in Years	Compact	Mid-Size	Luxury
New, 1	$160	$230	$310
2-3	$123	$185	$229
4-5	$110	$148	$201
6, more	$99	$129	$170

	Type of Car	Difference in Cost $50 and $100 Deductible	Total of Comprehensive and $50 Deductible	Total of Comprehensive and $100 Deductible
(a)	new luxury	$400 − $310 = $90	$190 + $400 = $590	$190 + $310 = $500
(b)	7 a old luxury			
(c)	3 a old compact			
(d)	1 a old mid-size			
(e)	5 a old luxury			
(f)	1 a old luxury			
(g)	new compact			
(h)	2 a old mid-size			
(i)	new mid-size			
(j)	5 a old compact			
(k)	10 a old luxury			
(l)	6 a old compact			
(m)	2 a old compact			
(n)	9 a old mid-size			
(o)	12 a old compact			

(p) Select the most inexpensive car from the chart to insure.
(q) Select the most expensive car from the chart to insure.

Math YOU Need

2. Why is it cheaper to insure older cars? Give reasons for your answer.

9.8 Checking Rates

Insurance rates vary as to the person's experience, distance from work, coverage, etc.

TABLE 1 This table gives typical annual premiums for a $200 000 inclusive public liability and property damage insurance policy.

	URBAN AREA AUTOMOBILE USED FOR			RURAL AREA AUTOMOBILE USED FOR		
AGE OF DRIVER	BUSINESS	DRIVING TO AND FROM WORK	PLEASURE	BUSINESS	DRIVING TO AND FROM WORK	PLEASURE
Over 25 a	$114	85	64	$88	62	50
Under 25 a	$270	270	260	$206	206	199

TABLE 2 This table shows typical annual premiums for a $50-deductible collision insurance policy.

	URBAN AREA AUTOMOBILE USED FOR						RURAL AREA AUTOMOBILE USED FOR					
AGE OF DRIVER	BUSINESS		DRIVING TO AND FROM WORK		PLEASURE		BUSINESS		DRIVING TO AND FROM WORK		PLEASURE	
	NEW	5 a OLD	NEW	5 a OLD	NEW	5 a OLD	NEW	5 a OLD	NEW	5 a OLD	NEW	5 a OLD
Over 25 a	$ 76	60	60	42	48	35	$ 68	51	46	38	44	35
Under 25 a	$210	161	210	161	210	161	$190	143	190	143	190	143

Note Comprehensive = $\frac{1}{3}$ of collision premium

Medical = $ 500 coverage: $3 premium
$1000 coverage: $4 premium
$2000 coverage: $5 premium

For example, Jim, 22, passed a driver-training course. This entitles him to a 20% discount on insurance premiums. His insurance coverage for his new car is:

PL and PD: $200 000
Collision: $50 deductible
(See table in 9.8.)
Comprehensive,
$2000 Medical

Jim drives mainly to and from work. Calculate his premium.

Coverage	Premium	
PL and PD	$270.00	
Collision	210.00	
Comprehensive $\left(\frac{1}{3}\text{ Collision}\right)$	70.00	
Medical	5.00	
TOTAL	555.00	
LESS: 20% Driver Training Discount	111.00	($555 × 0.20 = $111.00)
TOTAL PREMIUM	$444.00	

1. Calculate the premiums for these people using the tables.

DRIVER	CAR	P.L. & P.D.	COLLISION $50 DEDUCTIBLE	COMPREHENSIVE	MEDICAL INSURANCE	TOTAL PREMIUM	DRIVER-TRAINING DISCOUNT/FINAL PROGRAMME
John, age 20 a, rural location	4 a old, driven to and from work	$200 000 ($206.00)	yes ($190.00)	yes $\frac{1}{3}$ of $190 = $63.33	$1000 ($4.00)	$463.33	20% 20% of $463.33 = $92.67 $463.33 − $92.67 = $370.66
Ann, age 22 a, urban location	1 a old, driven for pleasure	$200 000	yes	yes	$2000		no
Mr. Jon, age 41 a, urban location	2 a old, driven for business	$200 000	yes	yes	$2000		no
Mr. Exon, age 40 a, rural location	new, driven for pleasure	$200 000	yes	yes	$1000		no
Allen, age 31 a, urban location	4 a old driven to and from work	$200 000	yes	yes	$2000		10%
Mike, age 25 a, urban location	3 a old, driven to and from work	$200 000	yes	yes	$1000		15%

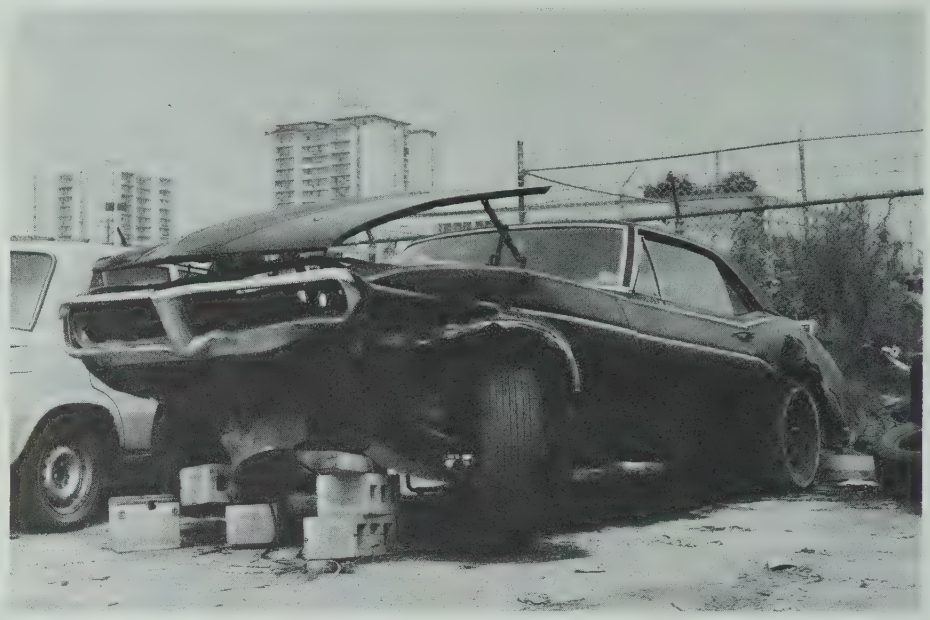
Math YOU Need

2. Why are insurance rates cheaper for rural areas? Give reasons for your answer.

9.9 Insurance Risks

Insurance rates *do* go down — however, you have to be a certain age before they will!

Insurance companies base their rates on information about drivers. The highest rates are for drivers under the age of 25. It has been found that drivers under 25 have a higher rate of accidents.



	Driver	Claims per 100 cars Urban (City) Area
(a)	pleasure drivers over 25 who don't drive to work	7.8
(b)	pleasure drivers over 25 who drive to work	9.7
(c)	single men under 19 with less than one year's experience	37.6
(d)	single women under 21 with less than one year's experience	16.9
(e)	married men under 21 with less than one year's experience	22.8

Unfortunately, under the age of 25, individual good drivers still have to pay higher rates. A driver-training certificate will take a percentage off. However, rates will only come down:

(a) if the driver turns 25
(b) if the driver gets married
(c) if the driver gets married *and* turns 25.

Also, females pay less for insurance than males.

Answer these questions using information you have learned or already know.

1. Give ways that you can reduce insurance costs.

2. Give reasons why drivers under 25 have to pay more for insurance.

3. Give reasons why a bad driving record can affect insurance premiums.

4. Why is it a good idea to take a safe driving course?

Math YOU Need

5. Do you feel insurance companies are fair in how they determine premiums? Give reasons for your answer.

9.10 Life Insurance

Another type of insurance is life insurance. This page will help you understand what it is.

Life insurance gives financial protection for the future. If the insured person dies, the beneficiary (person named in a policy other than the insured) gets the money. If the insured, after age 65, lives, he or she can collect the money (depending on the policy*). Life insurance premiums are based on many variables:

(a) age when policy is written: the older the person, the higher the premium;
(b) kind of policy: if a higher premium is paid, the return (the amount paid by the insurance company) is usually higher;
(c) health: poor health means a higher premium;
(d) employment: dangerous jobs mean higher premiums.

1. List some advantages of having life insurance.

2. List some disadvantages of having life insurance.

3. Unlike car insurance, life insurance costs less if you're younger. Give reasons for this.

4. Do you feel life insurance is necessary? Give reasons for your answer.

5. Canadians are the most insured people in the world. Give possible reasons for this.

* An *endowment* policy guarantees payment to the person insured at a given date; the insured person does not have to die to collect. Other types of policies (e.g. *term*, *whole life* and *limited payment* policies) are payable to a beneficiary *only* when the insured person dies.

Math YOU Need

6. When do you think a person should get life insurance? Give a reason for your answer.

9.11 Table of Mortality

Insurance companies use a Table of Mortality to help calculate premiums.

TABLE OF MORTALITY

Age	Number Living	Deaths Each Year	Deaths Per 1000	Age	Number Living	Deaths Each Year	Deaths Per 1000	Age	Number Living	Deaths Each Year	Deaths Per 1000
8	9830	12	1.2	21	9648	18	1.9	34	9396	23	2.4
9	9818	12	1.2	22	9630	18	1.9	35	9373	23	2.5
10	9806	12	1.2	23	9612	18	1.9	36	9350	24	2.6
11	9794	12	1.2	24	9594	18	1.9	37	9326	27	2.9
12	9782	12	1.2	25	9576	19	2.0	38	9299	28	3.0
13	9770	13	1.3	26	9557	19	2.0	39	9271	30	3.2
14	9757	14	1.4	27	9538	19	2.0	40	9241	33	3.6
15	9743	14	1.4	28	9519	19	2.0	41	9208	35	3.8
16	9729	15	1.5	29	9500	20	2.1	42	9173	38	4.1
17	9714	16	1.6	30	9480	20	2.1	43	9135	41	4.5
18	9698	16	1.6	31	9460	21	2.2	44	9094	45	4.9
19	9682	17	1.8	32	9439	21	2.2	45	9049	48	5.3
20	9665	17	1.8	33	9418	22	2.3	46	9001	53	5.9
								47	8948	57	6.4
								48	8891	62	7.0
								49	8829	67	7.6
								50	8762	73	8.3
								51	8689	79	9.1
								52	8610	86	10.0
								53	8524	93	10.9
								54	8431	100	11.9
								55	8331	108	13.0
								56	8223	117	14.2
								57	8106	126	15.5
								58	7980	135	16.9
								59	7845	146	18.6
								60	7699	157	20.4
								61	7542	168	22.2
								62	7374	179	24.3
								63	7195	191	26.5
								64	7004	203	29.0
								65	6801	216	31.8
								66	6585	229	34.8
								67	6356	242	38.1
								68	6114	255	41.7
								69	5859	267	45.6
								70	5592	278	49.7
								71	5314	288	54.2
								72	5026	295	58.7
								73	4731	299	63.2
								74	4432	302	68.1
								75	4130	303	73.4
								76	3827	303	79.2
								77	3524	302	85.7
								78	3222	300	93.1
								79	2922	296	101.3
								80	2626	288	109.7

1. Use the above table to complete this chart.

	Age	Number Living	Deaths Each Year
(a)	8	9830	12
(b)	12		
(c)	51		
(d)	64		
(e)	31		

	Age	Number Living	Deaths Each Year
(f)	28		
(g)	19		
(h)	79		
(i)	45		
(j)	30		

2. Probability is used in calculating premiums. These are written as ratios. For example,

   Probability of dying at age 10
   = number of deaths: number living
   = 12 : 9806

   Give the probability of dying at these ages.

   (a) 11 = 12 : 9794
   (b) 64 =
   (c) 18 =.
   (d) 27 =
   (e) 35 =
   (f) 48 =

3. What is the probability that a 16 a old will live to 80?

   PROBABILITY = NUMBER LIVING AT HIGHER AGE ÷ NUMBER LIVING AT LOWER AGE
   = 2626 ÷ 9729
   = 0.2699
   = 0.27 rounded to the nearest hundredth.

   Give the probability of

   (a) a 20 a old living to 30.
   (b) a 60 a old living to 80.
   (c) a 34 a old living to 50
   (d) a 15 a old living to 65.

Math YOU Need

4. Give the probability of you living to the age of 80.

9.12 Calculating Premiums

This page will show you how life insurance premiums are calculated.

ANNUAL PREMIUMS PER $1000 LIFE INSURANCE

AGE AT ISSUE	5 a TERM	ORDINARY LIFE	20-PAYMENT LIFE	20 a ENDOWMENT
16	$4.35	$ 9.66	$17.20	$22.62
17	$4.40	$ 9.97	$17.66	$23.14
18	$4.46	$10.30	$18.13	$23.68
19	$4.52	$10.63	$18.61	$24.24
20	$4.58	$10.98	$19.10	$24.82
21	$4.63	$11.35	$19.59	$25.42
22	$4.89	$11.72	$20.10	$26.03
23	$4.74	$12.11	$20.62	$26.66
24	$4.79	$12.52	$21.15	$27.31
25	$4.85	$12.94	$21.69	$27.98

The above premiums are calculated from the mortality table. They show the premiums for every $1000 of insurance of 5 a terms, ordinary life, 20-payment life, and 20 a endowment insurance.

For example, give the annual (yearly) premium for a $10 000 ordinary life policy issued at age 19.

ANNUAL PREMIUM = PREMIUM PER $1000 × (PRINCIPAL ÷ $1000)
= $10.63 × ($10 000 ÷ $1000)
= $10.63 × 10
= $106.30

1. Calculate the annual premiums for these policies. Use the above table.

	Policy	Amount	Age at Issue*	Premium per $1000	Annual Premium
(a)	ordinary life	$2000	16	$9.66	$9.66 × ($2000 ÷ $1000) = 9.66 × 2 = $19.32
(b)	5 a term	$3000	18		
(c)	ordinary life	$8000	21		
(d)	20-payment life	$4000	24		
(e)	20 a endowment	$6500	25		
(f)	ordinary life	$12 200	17		
(g)	20-payment life	$10 750	18		
(h)	5 a term	$10 700	24		

* age when the policy starts.

2. Premiums can be paid yearly, half-yearly, quarter-yearly or monthly. These are calculated by multiplying by 0.51, 0.26, or 0.087. Calculate these premiums.

	Yearly Premium	Half-Yearly Premium	Quarter-Yearly Premium	Monthly Premium
(a)	$108.00	$108 × 0.51 = $55.08	$108 × 0.26 = $28.08	$108 × 0.087 = $9.40
(b)	$112.60			
(c)	$148.30			
(d)	$214.75	(NOTE: If multiplied out, the half-year, quarter-year and monthly payments are higher than one yearly payment. This is because insurance companies add a charge for the calculations.)		
(e)	$216.86			
(f)	$237.90			

Math YOU Need

3. George took out a $15 000 ordinary life policy at age 24. How much would he have saved on yearly premiums if he had taken out the policy at age 17?

9.13 Cash-Surrender Value

CASH-SURRENDER VALUE
Guaranteed Cash Values Per $1000
Ordinary Life

AGE AT ISSUE	END OF 5 a	END OF 10 a	END OF 15 a	END OF 20 a	AT AGE 65
16	$13	$ 58	$109	$183	$603
17	$14	$ 60	$114	$189	$600
18	$15	$ 63	$118	$196	$597
19	$17	$ 66	$123	$203	$594
20	$18	$ 70	$129	$209	$591
21	$20	$ 73	$134	$217	$587
22	$21	$ 76	$140	$224	$584
23	$23	$ 80	$145	$231	$580
24	$24	$ 84	$151	$239	$575
25	$26	$ 88	$157	$246	$571

Some insurance policies can "make" money for you. This is called cash-surrender value. This comes into effect after 2 a to 5 a. The cash can be

(a) used to build more insurance in the policy;
(b) taken if policy is discontinued;
(c) borrowed;
(d) used to help pay for the policy.

For example, the above table shows cash-surrender values for $1000. What would be the cash surrender value on a $10 000 policy issued at age 18, after 10 a?

CASH SURRENDER VALUE = VALUE PER $1000 × (PRINCIPAL ÷ $1000)
= $63 × ($10 000 ÷ $1000)
= $63 × 10
= $630

1. Find the cash-surrender values for these ordinary life policies.

	Amount of Policy	Age at Issue	Years in Effect	Cash Value per $1000	Cash-Surrender Value
(a)	$9000	21	5	$20	$20 × ($9000 ÷ $1000) = $20 × 9 = $180
(b)	$9000	22	10		
(c)	$9000	20	10		
(d)	$12 000	25	5		
(e)	$15 750	25	50 (age 65)		
(f)	$8000	17	20		

2. Calculate the cash-surrender values for these policies.

	Amount of Policy	Age at Issue	Years in Effect	Cash Value per $1000	Cash-Surrender Value
(a)	$8500	21	10		
(b)	$9600	25	20		
(c)	$16 750	19	10		
(d)	$19 210	23	5		
(e)	$12 050	18	15		
(f)	$13 500	17	20		

Math YOU Need

3. Louise has a $40 000 ordinary life policy issued at age 25. It is now 15 a old. How much money would she get if she cashed in the policy? Would she be better off to keep the policy?

9.14 Home Insurance

There's an old saying: "If you own it, insure it". Home insurance is very important.

People are encouraged to have insurance on their possessions and dwellings. This kind of insurance protects the insured from

(a) fire;
(b) theft of possessions;
(c) water, rot, wind damage to a house;
(d) vandalism;
(e) protection against lawsuits made by people who are injured on the insured owner's property;
(f) protection for other buildings on the insured owner's property.

One very important kind of insurance is fire insurance. Many factors affect the insurance premiums:

(a) location of dwelling: rural, urban, large city, town;
(b) value of property: higher value, higher premium;
(c) type of construction: brick, wood frame, aluminum siding;
(d) available fire protection: city water, well water, fire department, nearness to fire hydrant;
(e) risk to insurance company: how close dwelling is to heavy industries, airport, gasoline station; also, if there is a rising fire rate in the area, premiums go up.

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1. List some advantages of having fire insurance.

2. List any disadvantages you can think of for having fire insurance.

3. Give reasons why renters should have some form of fire insurance.

4. Give reasons why theft insurance is important to have.

5. Why is it a good idea to have insurance for people who get injured on your property?

Math YOU Need

6. Home insurance premiums are usually less than life or car insurance premiums. Give reasons for this.

9.15 Calculating Fire Insurance Rates

Fire insurance agents use a table similar to this to calculate premiums.

ANNUAL FIRE INSURANCE RATES PER $100 OF INSURANCE

CLASS OF COMMUNITY	TYPE OF DWELLING	
	BRICK	FRAME
A	$0.064	$0.104
B	$0.072	$0.108
C	$0.078	$0.113
D	$0.083	$0.118
E	$0.089	$0.124
F	$0.098	$0.134
G	$0.137	$0.173
H	$0.252	$0.271
K	$0.304	$0.321

For example, a family had $10 000 of fire insurance. They lived in a brick house, in a class B community. What was their annual premium?

ANNUAL PREMIUM = (PRINCIPAL ÷ $100) × TYPE OF DWELLING RATING
= ($10 000 ÷ $100) × $0.072
= 100 × $0.072
= $7.20

1. Calculate the annual premiums for these policies. Use the above table.

	Policy Amount	Class of Community	Type of Dwelling	Type of Dwelling Rating	Annual Premium
(a)	$20 000	A	brick	$0.064	($20 000 ÷ $100) × $0.064 = $12.80
(b)	$27 000	B	frame		
(c)	$35 000	F	frame		
(d)	$40 000	G	brick		
(e)	$55 000	K	brick		
(f)	$60 000	C	frame		
(g)	$70 000	E	brick		
(h)	$50 000	D	frame		

2. Calculate the annual premiums for these policies.

	Policy Amount	Class of Community	Type of Dwelling	Type of Dwelling Rating	Annual Premium
(a)	$35 000	K	brick		
(b)	$46 000	A	frame		
(c)	$82 000	C	frame		
(d)	$91 000	D	brick		
(e)	$112 000	H	brick		
(f)	$200 000	K	frame		
(g)	$145 000	E	brick		
(h)	$200 000	F	frame		

Math YOU Need

3. The O'Hare family lives in a class E community. They have $76 000 fire insurance on their brick house. What is their premium every 6 months? See Section 9.12, Question 2.

9.16 True – value Replacement

Insurance companies try to get homeowners to insure their properties to at least 80% of the property value. If the property is insured for at least 80% property value, the company will pay 100% of the damage.

For example, a family had a policy of $25 000. Their property value was $30 000. Fire damage to their home was $22 000. Did the insurance company pay the full loss?

80% FORMULA = PROPERTY VALUE × 80%
= $30 000 × 0.80
= $24 000.

Since $24 000 is less than the policy amount of $25 000, the company will pay the total loss.

1. Calculate to see if the company will pay the total loss for these.

	Policy Amount	Property Value	Damage	80% Formula	Will Company Pay Full Loss?
(a)	$30 000	$40 000	$16 000	$40 000 × 80% = $32 000	No
(b)	$60 000	$68 000	$20 000		
(c)	$25 000	$34 000	$12 000		
(d)	$42 000	$57 000	$40 000		
(e)	$75 000	$78 000	$60 000		
(f)	$80 000	$95 000	$24 000		
(g)	$90 000	$110 000	$80 000		
(h)	$110 000	$150 000	$95 000		

2. A special formula is applied when the owner doesn't meet the condition of the 80% formula. For example,

Policy $22 000
Property Value $30 000
Damage $22 000

80% FORMULA = $30 000 × 80%
= $24 000

Since the policy is for $22 000, the owner is underinsured by $2000 ($24 000 − $22 000). This formula is then applied:

LOSS PAID BY COMPANY = (POLICY ÷ 80% PROPERTY VALUE) × DAMAGE
= ($22 000 ÷ $24 000) × $22 000
= 0.9167 × $22 000
= $20 167 (Rounded to the nearest dollar)

LOSS PAID BY OWNER = DAMAGE − LOSS PAID BY COMPANY
= $22 000 − $20 167
= $1833

Calculate the amounts paid by the company and the owner for these damages.

	Policy Amount	Property Value	Damage	80% Formula	Paid by Company	Paid by Owner
(a)	$18 000	$28 000	$15 000	$28 000 × 80% = $22 400	($18 000 ÷ $22 400) × $15 000 = $12 053.57	$15 000 − $12 053.57 = $2946.43
(b)	$20 000	$34 000	$12 500			
(c)	$48 000	$62 000	$18 000			
(d)	$40 000	$48 000	$42 000			
(e)	$16 000	$26 000	$5000			

Math YOU Need

3. Ross had a $35 000 policy. His property value was $46 000. A fire in his home caused $18 000 damage. Ross thought the company should pay the full loss. Was he right?

9.17 Think About It: Annual and Periodic Premium Payments

LIFE INSURANCE: ANNUAL PREMIUMS PER $1000 WORTH OF INSURANCE

AGE AT ISSUE	TERM		WHOLE-LIFE	LIMITED-PAYMENT		ENDOWMENT	
	10 a	15 a		20 a	30 a	20 a	30 a
15	-	-	$16.76	$28.11	$23.08	$50.45	$32.88
20	$ 8.75	$ 9.17	$18.68	$31.55	$24.90	$50.76	$33.39
25	$ 9.50	$10.07	$20.95	$34.33	$27.26	$51.28	$34.16
30	$10.72	$11.58	$23.84	$37.48	$29.91	$52.06	$35.37
35	$12.53	$13.85	$27.42	$41.15	$33.16	$53.28	$37.15
40	$15.27	$18.28	$31.96	$45.48	$37.24	$55.17	$39.99
45	$19.54	$22.46	$37.78	$50.73	$42.56	$58.06	$44.23
50	$26.98	$30.30	$45.48	$57.35	$49.78	$62.53	$50.62
55	$35.78	-	$55.56	$66.23	$59.78	$69.49	-
60	-	-	$69.22	$78.53	$73.81	$80.28	-

Insurance companies allow the insured to pay their premium annually, semi-annually, quarterly, or monthly. The above table helps to calculate annual premiums. To calculate the other three premium payments, follow this:

To Compute Periodic Premium	
If period is	**Multiply Annual Premium By**
semi-annual	0.51
quarterly	0.26
monthly	0.087

For example, a policy has an annual premium of $214. Calculate what the monthly premium payments would be. MONTHLY PAYMENTS $= \$214 \times 0.087$
$= \$18.62$

1. Use the above table to calculate the following annual premiums.

	Policy	Age At Issue	Face Value	Cost per $1000	Annual Premium
(a)	15 a term	20	$5000	$9.17	$9.17 × ($5000 ÷ $1000) = $9.17 × 5 = $45.85
(b)	whole life	35	$5000		
(c)	20 a endowment	50	$15 000		
(d)	20-payment life	25	$20 000		
(e)	straight life	30	$100 000		
(f)	10 a term	40	$15 000		
(g)	15 a term	50	$25 000		
(h)	30 a endowment	20	$20 000		

2. Calculate the payments for these policies.

	Policy	Age At Issue	Face Value	Cost Per $1000	Annual Premium	Payment Period	Period Payment
(a)	15 a term	20	$5000	$9.17	$9.17 × 5 = $45.85	semi-annual	$45.85 × 0.51 = $23.38
(b)	30 a endow.	25	$10 000			quarterly	
(c)	whole life	35	$15 000			semi-annual	
(d)	20 a endow.	40	$25 000			monthly	
(e)	20 a endow.	30	$20 000			semi-annual	
(f)	15 a term	25	$40 000			semi-annual	

(g) For any of the above policies, which is the least expensive way of paying the premium: annually, semi-annually, quarterly, or monthly?

9.18 Test Run

UNIT 9 REVIEW TEST

Now that you've learned everything (or almost everything) about insurance, try this test. Can you do it in less than 15 min?

1. Who pays higher premiums:
   — drivers over 25?
   — drivers under 25?

2. Why do females pay less for car insurance?

3. Why does life insurance cost more if you're older?

4. You have a life insurance policy of $30 000. When will the cash-surrender value be the highest:
   — after 5 a?
   — after 10 a?
   — after 15 a?

5. Carl has a brick house in a class A community. The "dwelling rating" is $0.064. His policy is for $44 000. What is his annual premium?

6. Joan has a property worth $65 000. Her policy is for $58 000. Will the insurance company pay the full cost of damages if she has a $36 000 fire?

TAKE-A-BREAK — Multiplying with 1000, 100, 10, 0.1, 0.01, 0.001

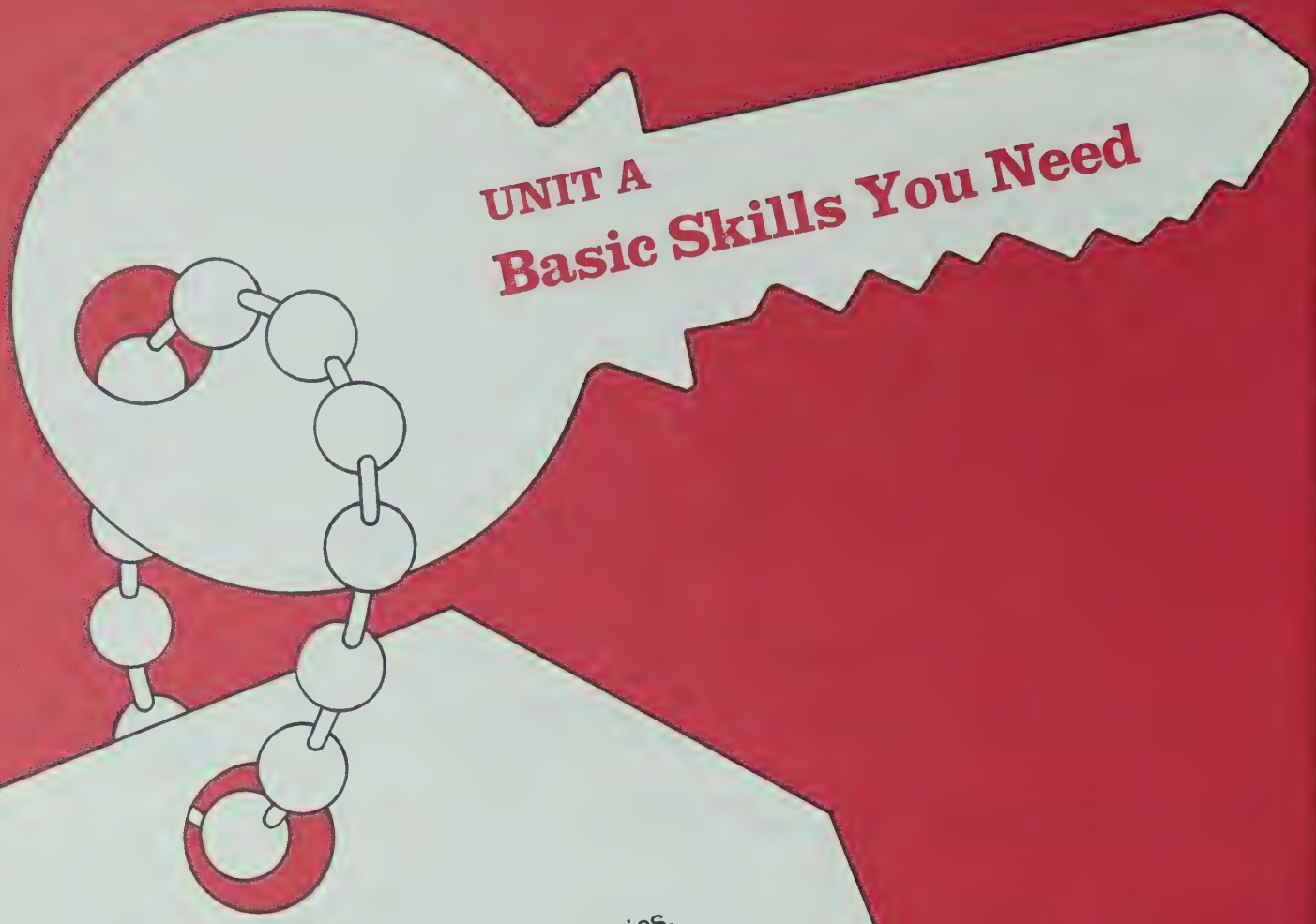
The title of this book is *Math You Need*. Use this code to discover a new title that you could use now. Answer the questions below, then fill in the blanks with the letters from the code.

$6.8 \times 1000 =$ _____
$43 \times 10 =$ _____
$75 \times 0.1 =$ _____
$6.8 \times 10 =$ _____

$31 \times 1000 =$ _____
$6 \times 0.01 =$ _____
$83 \times 0.001 =$ _____

$0.68 \times 100 =$ _____
$4.3 \times 100 =$ _____
$7.09 \times 0.1 =$ _____
$3.8 \times 0.01 =$ _____

430	= A	31 000	= Y
0.083	= U	7.5	= T
0.038	= E	0.709	= V
68	= H	0.06	= O
6800	= M		



UNIT A
Basic Skills You Need

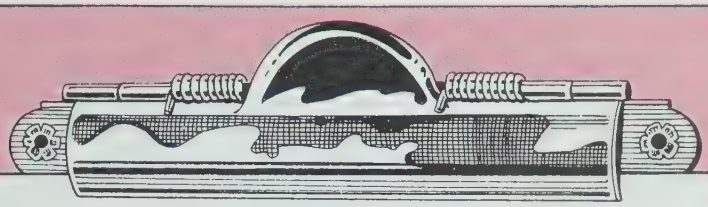
APPENDIX: SKILLS BANK

Math is not that difficult if you know some of the basics.
This unit will help.

A1 Calculate or Calculator?
A2 Mental Arithmetic
A3 Rounding Off Decimal Fractions/Place Value
A4 Estimating
A5 Approximate Answers
A6 Does the Answer Make Sense?
A7 Reading Diagrams
A8 Reading Graphs
A9 Following the Steps

A1 Calculate or Calculator?

Which is faster: you or a calculator? This page will help you find out.
Below is a sales and wage summary sheet from Fred's Furniture Farm. Complete the sheet without using a calculator. Time yourself. Then, re-do the sheet using a calculator. Again, time yourself. Which is faster?



FRED'S FURNITURE FARM
Summary of: July 4 — July 21

1. SALES (FURNITURE DEPARTMENT)

Item	Price/Item	Number Sold	Total Money from Sales
bed	$170.00	8	$170 × 8 = $1360
sofa	$385.00	3	
end table	$ 48.90	5	
television	$619.95	10	
wine rack	$ 24.80	21	
chair	$ 69.00	7	
coat rack	$118.25	13	
shelf unit	$175.00	5	

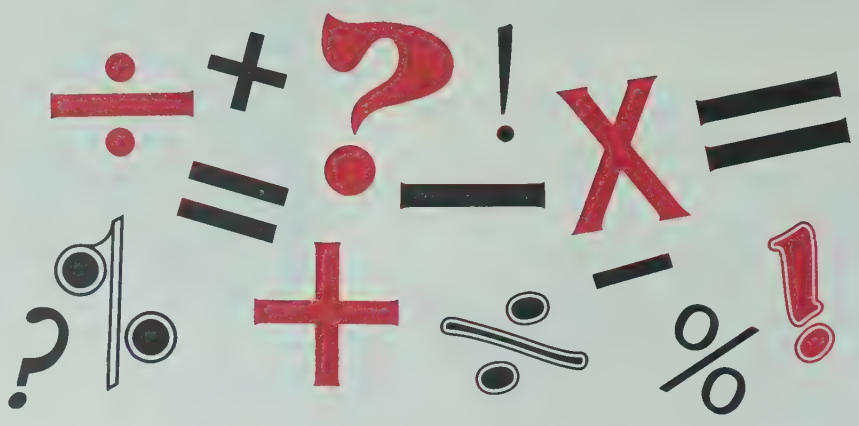
2. WAGES (COMMISSION)

Employee	Total Sales	Commission Rate	Total Wages Earned
Ted	$1440	4%	
Hale	$1375	6%	
Marie	$13 712	10%	
Stan	$8614	12%	
Floyd	$3719	18%	
Gilda	$6880	22%	
Heath	$7196	25%	
Janice	$10 780	27%	

3. WAGES (HOURLY)

Employee	Hourly Rate	Hours Worked	Total Wages Earned
Rita	$6.50	40	
Paul	$7.10	40	
Harry	$8.90	36	
John	$9.35	38	

A2 Mental Arithmetic



It helps if you can make quick calculations in your head.
This page will give you practice with "Mental Arithmetic".

1. Find the missing numbers in these equations.
(Remember: do them in your head!)

(a) _____ × _____ = 25
(b) _____ × _____ = 36
(c) _____ × _____ = 58
(d) _____ + _____ − _____ = 31
(e) _____ + _____ − _____ = 42
(f) _____ − _____ − _____ = 14
(g) _____ ÷ _____ = 8
(h) _____ ÷ _____ = 20
(i) _____ ÷ _____ = 42

2. Try the MONEY game. Bills are represented by □. Coins are represented by 0. For example, $1.50 is shown as □00. This shows one $1.00 bill and two $0.25 coins. Find the bills and coins for these amounts.

(a) $4.10 = □□□□00
(b) $5.85 = □0000
(c) $6.15 = □□□000
(d) $8.77 = □□□00000
(e) $2.20 = □□000
(f) $10.29 = □□00000
(g) $11.86 = □□□□00000
(h) $19.33 = □□□□000000
(i) $22.67 = □□□0000000
(j) $48.19 = □□□□□000000

3. Choose the correct answer for each of these.

(a) 75 × 10 = (i) 7500 (ii) 750 (iii) 7510
(b) 63 ÷ 100 = (i) 63 (ii) 6.3 (iii) 0.63
(c) 68 + 75 + 29 = (i) 172 (ii) 1712 (iii) 272
(d) 84 + 48 + 80 = (i) 202 (ii) 212 (iii) 121
(e) 97 ÷ 1000 = (i) 0.0097 (ii) 0.097 (iii) 0.97
(f) 10% of 200 = (i) 20 (ii) 0.20 (iii) 21
(g) 25 × 50 = (i) 12 500 (ii) 1250 (iii) 1205
(h) 76 ÷ 0.1 = (i) 0.76 (ii) 7.6 (iii) 760

4. How fast can you add these? Time yourself.

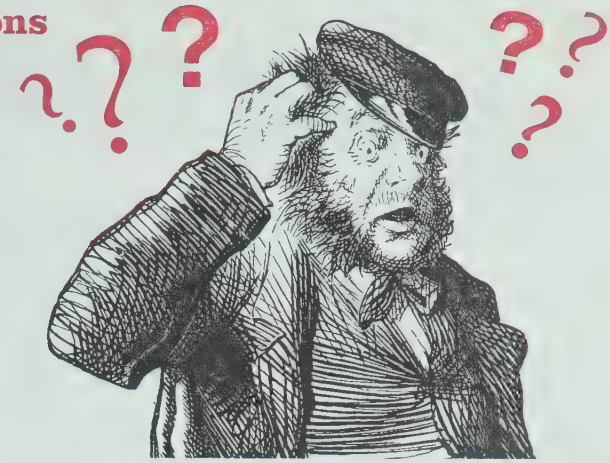
(a)
600
750
200
+ 910

(b)
7100
800
550
+ 725

(c)
4810
900
650
+ 710

(d) 6 + 7 + 9 + 3 + 2 =
(e) 8 + 1 + 9 + 8 + 2 =
(f) 20 + 40 + 20 + 8 =
(g) 16 + 16 + 16 + 18 =
(h) 3 + 4 + 5 + 6 + 8 =
(i) 1 + 2 + 5 + 7 + 9 =

A3 Rounding-Off Decimal Fractions



When people estimate, they often use words like "around" or "about". Rounding-off numbers is the first step in estimating.

1. Round off these decimal fractions to one decimal place.
   - (a) 6.28 = 6.3
   - (b) 9.14 =
   - (c) 72.018 =
   - (d) 64.096 =
   - (e) 16.194 =
   - (f) 72.687 =
   - (g) 0.149 =
   - (h) 0.826 =

2. Round off these decimal fractions to two decimal places.
   - (a) 7.149 = 7.15
   - (b) 6.963 =
   - (c) 8.514 =
   - (d) 10.608 =
   - (e) 94.017 =
   - (f) 86.662 =
   - (g) 9.317 8 =
   - (h) 10.118 9 =

3. Round off these decimal fractions to three decimal places.
   - (a) 0.197 8 = 0.198
   - (b) 0.322 4 =
   - (c) 0.657 9 =
   - (d) 1.864 3 =
   - (e) 3.006 9 =
   - (f) 2.084 7 =
   - (g) 0.114 68 =
   - (h) 9.776 97 =

4. Round off the amount for each item on these sales slips to the nearest dollar.

(a)

GEEK'S RECORDS AND TAPES

Item	Price
Needle	$17.95
Tapes	$31.67
45's	$10.17
L.P's	$21.55
Record cleaner	$ 3.76
Total	

(b)

GEEK'S RECORDS AND TAPES

Item	Price
Tapes	$ 2.49
L.P's	$ 7.19
45's	$ 3.78
Cassette case	$12.45
Total	

(c)

GEEK'S RECORDS AND TAPES

Item	Price
L.P's	$13.62
8-track tape	$ 7.95
Head cleaner	$21.45
Cassette case	$12.45
45's	$ 3.70
Total	

(d) Calculate the approximate total for each sales slip by adding your rounded-off amounts.

A4 Estimating

We estimate when we want a quick answer. For example, Marie wants a tune up and compression check for her 4-cylinder car. She has $80.00. Is this enough money?

Estimate the amounts by rounding, then adding.

4-cylinder tune up $69.95	→	$70.00	rounded to the nearest dollar
compression check $12.70	→	$13.00	
Total estimate:		$83.00	

Marie will need almost $3.00 more.

PETE'S "NO FRILLS" GARAGE

SPECIALS (parts and labour included)

4-cyl. tune up	$69.95
6-cyl. tune up	$79.95
8-cyl. tune up	$89.95
compression check	$12.70
electrical system check	$10.55
tire rotation	$ 9.80
exhaust system check	$ 4.85
oil change and grease	$15.65

1. Estimate to see if these people can afford the work done on their cars. Use the above price list.
   (a) George has $75.00. He wants a 4-cylinder tune up and tire rotation.
   (b) Mel has $36.00. He wants tire rotations done on 3 cars.
   (c) Jay has $375.00. He needs 8-cylinder tune ups done on 4 trucks.
   (d) Lisa has $110.00. She wants an 8-cylinder tune up, oil change and grease, and a compression check.
   (e) Ed has $16.00. He wants an exhaust system check and an electrical system check.
   (f) Rita has $165.00. She wants a 6-cylinder tune up, and an 8-cylinder tune up.

2. Choose the best estimate for each job. Use the price list from the top of the page.
   (a) 4-cylinder tune up, tire rotation, exhaust system check.
   (i) $85.00 (ii) $75.00 (iii) $82.00
   (b) 6-cylinder tune up, electrical system check, compression check.
   (i) $105.00 (ii)$101.00 (iii) $103.00
   (c) 8-cylinder tune up, oil change and grease, tire rotation.
   (i) $116.00 (ii) $106.00 (iii) $126.00
   (d) Exhaust system check, 4-cylinder tune-up, compression check.
   (i) $98.00 (ii) $85.00 (iii) $88.00
   (e) 8-cylinder tune up, 6-cylinder tune up, tire rotation (on 2 cars).
   (i) $200.00 (ii) $110.00 (iii) $180.00

3. Art has $135.00. Which of these specials could he afford?

(a)

Weekend Special!	
Tune-up	$75.95
Oil change and grease	$15.65
Electrical check	$25.75

(b)

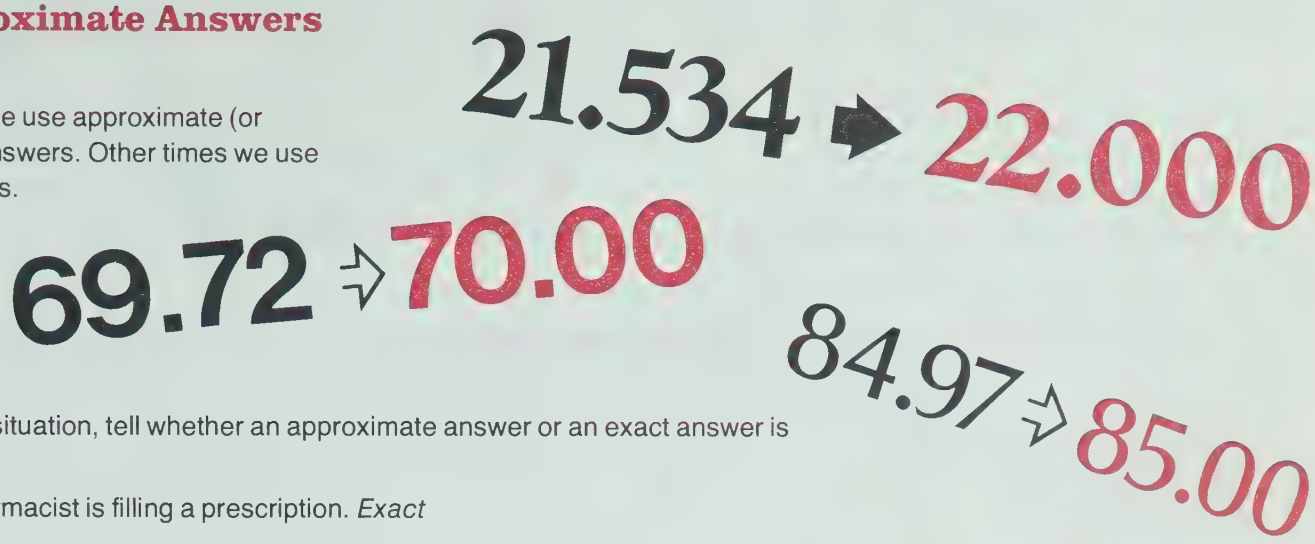
Traveller's Check!	
Tune-up	$91.50
Tire Rotation	$12.50
Oil change and grease	$21.75

(c)

PETE'S "NO FRILLS" SPECIAL	
Tune-up	$89.98
Oil change and grease	$11.95
All-systems check	$35.75

A5 Approximate Answers

Sometimes we use approximate (or estimated) answers. Other times we use exact answers.



1. For each situation, tell whether an approximate answer or an exact answer is needed.
   - (a) A pharmacist is filling a prescription. *Exact*
   - (b) A bricklayer orders bricks for a house. _____
   - (c) A runner is timed in a race. _____
   - (d) A farmer counts her herd of cattle. _____
   - (e) A farmer buys feed for her herd of cattle. _____
   - (f) A doctor feels your pulse. _____
   - (g) A player measures his golf shot. _____
   - (h) A weatherman gives a forecast. _____
   - (i) Two people split the winnings from a lottery. _____
   - (j) A person is asked how many days old he is. _____

2. Choose the best estimated answer for each problem.
   - (a) Gail is making a patio 4 m long, 3 m wide and 25 cm thick. About how much concrete does she need?

     (i) 4 m^3 (ii) 5 m^3 (iii) 3 m^3
   - (b) Rob planted 23 rows of corn. Each row has about 79 corn stocks. About how many corn stocks does he have altogether?

     (i) 1800 (ii) 1900 (iii) 2000
   - (c) Jacob delivered 39 pizzas. He earns $2.15 per pizza delivered. About how much money did he earn altogether?

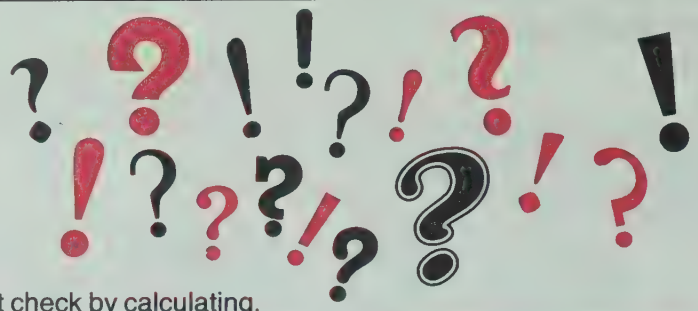
     (i) $96.00 (ii) $87.00 (iii) $83.00
   - (d) Shirts are on sale for $8.97 each. About how much will 12 shirts cost?

     (i) $110.00 (ii) $108.00 (iii) $115.00
   - (e) A car has a gas tank capacity of 91 L. About how much would a fill-up cost if gas sold for 39.9¢/L?

     (i) $30.00 (ii) $36.00 (iii) $38.00
   - (f) A stadium seats 30 890 people. Admission is $3.55 per seat. About how much money would be earned from a capacity crowd?

     (i) $105 000.00 (ii) $110 000.00 (iii) $115 000.00

A6 Does the Answer Make Sense?



People (and calculators) sometimes make mistakes. For this reason, it's a good idea to check bills and other items for errors. Use rounding, estimating, and common sense.

1. Check each bill to see if the total makes sense. Do not check by calculating.

(a) Art's Fishing Box

50 m fishing line	$ 3.75
18 lures	$21.45
7 hooks	$ 0.89
TOTAL	$26.09

(b) Lane's Billiards

6 games	$14.50
2 cues	$36.75
TOTAL	$41.25

(c) Poole Building Supplies

12 sheets plywood	$ 47.50
2 cans stain	$ 12.65
2 brushes	$ 7.80
3 kg nails	$ 4.52
TOTAL	$133.47

(d) The Blue Baker

3 birthday cakes	$27.00
1 doz. doughnuts	$ 2.49
2 doz. rolls	$ 3.50
TOTAL	$32.99

(e) Porter's Baggage

3 suitcases	$ 349.75
2 overnight cases	$ 179.60
3 purses	$ 64.76
2 pouch wallets	$ 12.75
TOTAL:	$6068.60

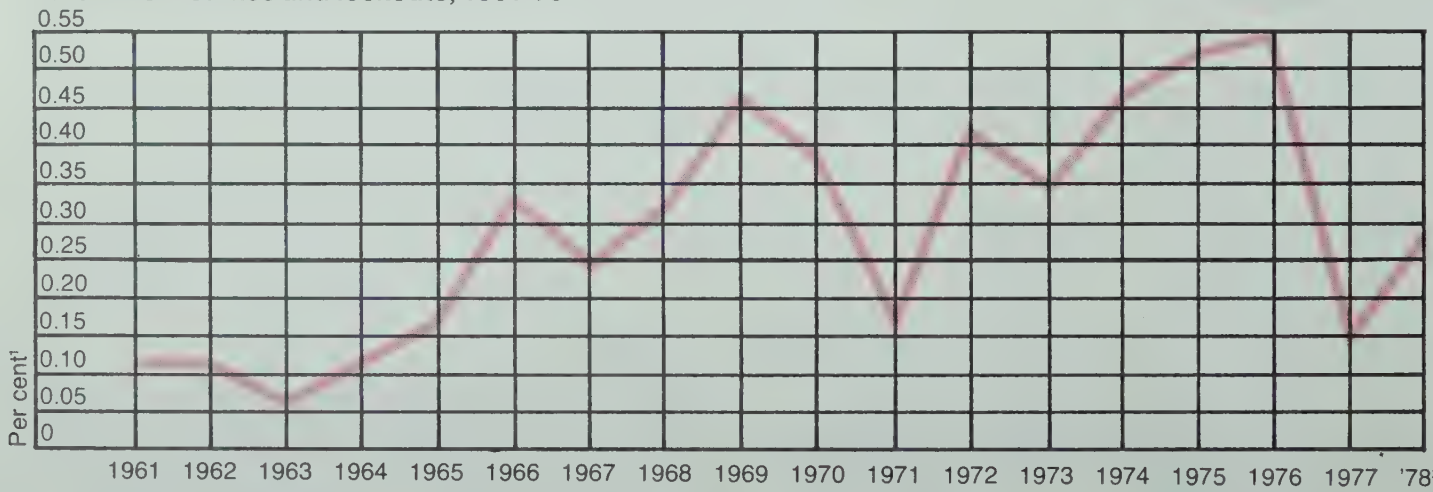
(f) Gail's Fabrics

3 m denim	$16.75
2 m lace	$ 3.98
10 m belt material	$29.86
4 m crimpeline	$16.34
TOTAL:	$66.93

2. These statements were checked by employees of Astounding Facts magazine. Check to see if the statements make sense.
   (a) Gerald Woolpool flew nonstop from Toronto to Edmonton after he refuelled at Winnipeg.
   (b) The largest dog in the world weighs 6.86 kg.
   (c) Louise Lopez won a gold medal for running the 1500 m race in 46.8 min.
   (d) The highest mountain peak in the world can be seen from Mount Everest.
   (e) A lottery prize of $500 000 was divided among 4 ticket holders. Each person got $150 000.

3. Answer the questions below about this line graph.

Time lost from strikes and lockouts, 1961-78

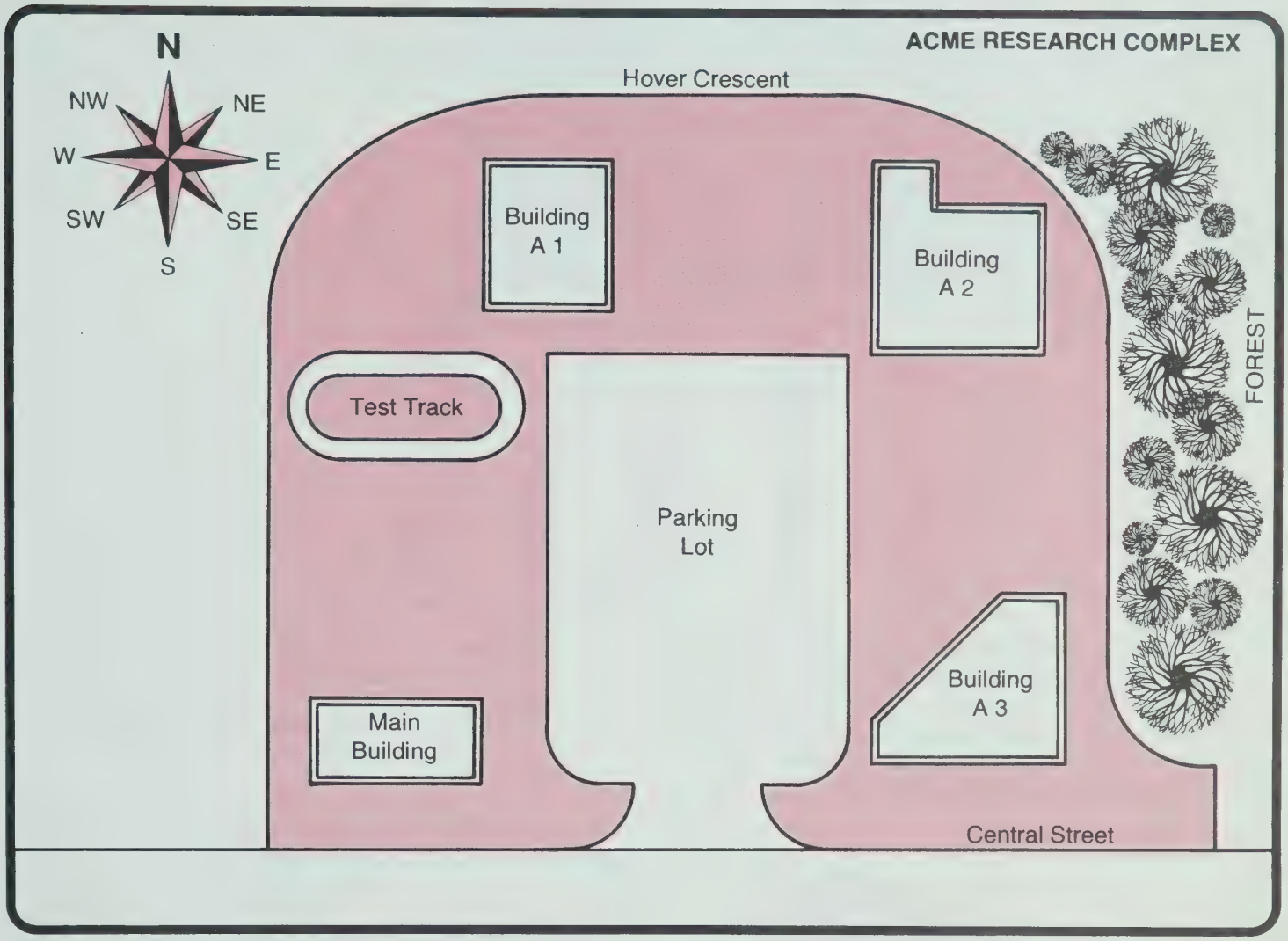


[1]Man-days lost as a percentage of estimated time of the labour force.
[2]1978 figure is a preliminary figure covering January to June 1978.
Source: Labour Canada, *Labour Gazette*, Vols. LII, LXV, LXVIII, LXVIII(2), LXXVI(5), and LXVIII(12). Courtesy of Statistics Canada.

   (a) Which year had the greatest number of strikes and lockouts?
   (b) Which year had the lowest number of strikes and lockouts?
   (c) Which 3-a period had few strikes and lockouts?
   (d) In what years, after 1969, did the strikes and lockouts decrease?
   (e) Which decade had the most strikes and lockouts: 1960's or 1970's?

A7 Reading Diagrams

Sometimes, information is given in a diagram. This diagram shows the Acme Research Complex.



Answer these questions about the above diagram.

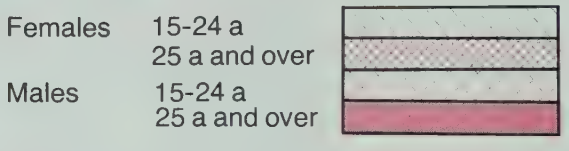
1. Which direction is Building A2 from the main building:
   (i) N? (ii) SE? (iii) NE?
2. Is the Test Track north or south of Central Street?
3. Which building is closest to the parking lot?
4. Which direction is Building A1 from the forest:
   (i) W? (ii) E? (iii) SW?
5. Is the Main Building near the east or west entrance of Hover Crescent?
6. Which buildings are south of Central Street?
7. Where is the entrance to the Parking Lot from Hover Crescent?

A8 Reading Graphs

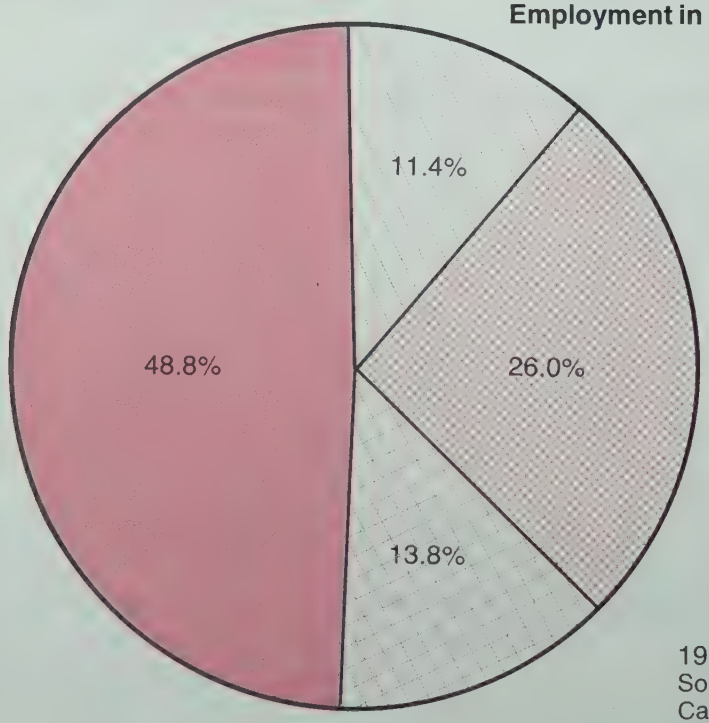
People often use graphs to show information. A graph gives the information in a clear way without a lot of words.

1. Answer these questions about the bar graph.
   (a) Who raised the most amount of money?
   (b) Who raised the least amount of money?
   (c) How much money did Ted raise?
   (d) How much money did Angela raise?
   (e) How much money did the people raise altogether?

2. Answer the questions below about this circle graph.
   (a) What was the total employment in 1977?
   (b) What age group had the highest percent of workers?
   (c) What age group had the lowest percent of workers?
   (d) What percent did the females, 25 a and over have?
   (e) What do all of the percents add up to?



Employment in 1977, by age groups

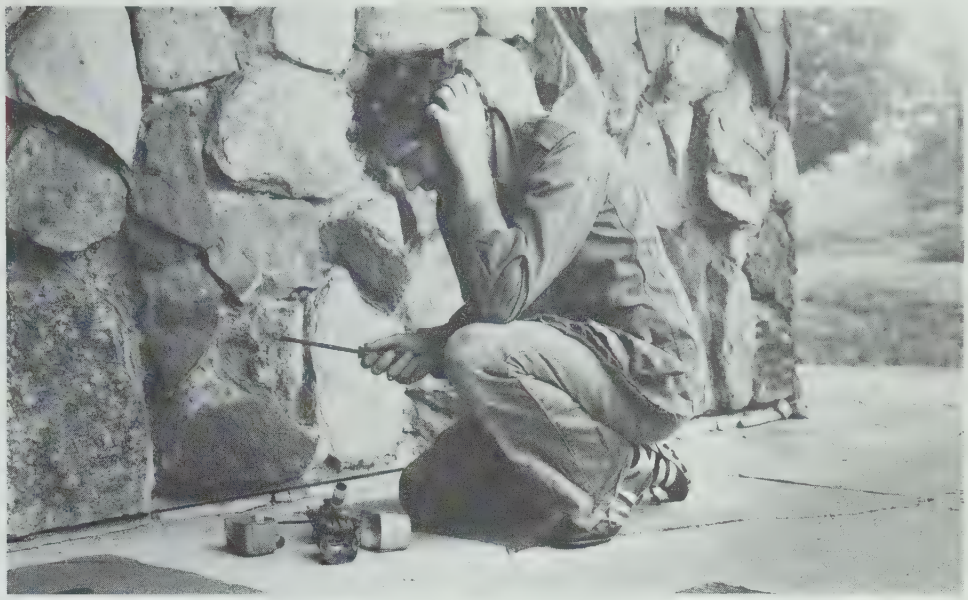


1977 Total employment: 9 754 000
Source: *Historical Labour Force Statistics*, Catalogue 71-201, 1978.
Courtesy of Statistics Canada

A9 Following the Steps

Have you ever tried putting something together without reading the directions? Sometimes, the results are not what you expect!

Whenever you do something, it's always easier if you follow the steps.



1. One of the steps in this set of directions is out of place. Which one is it? Rewrite the steps in the correct order in your notebook.

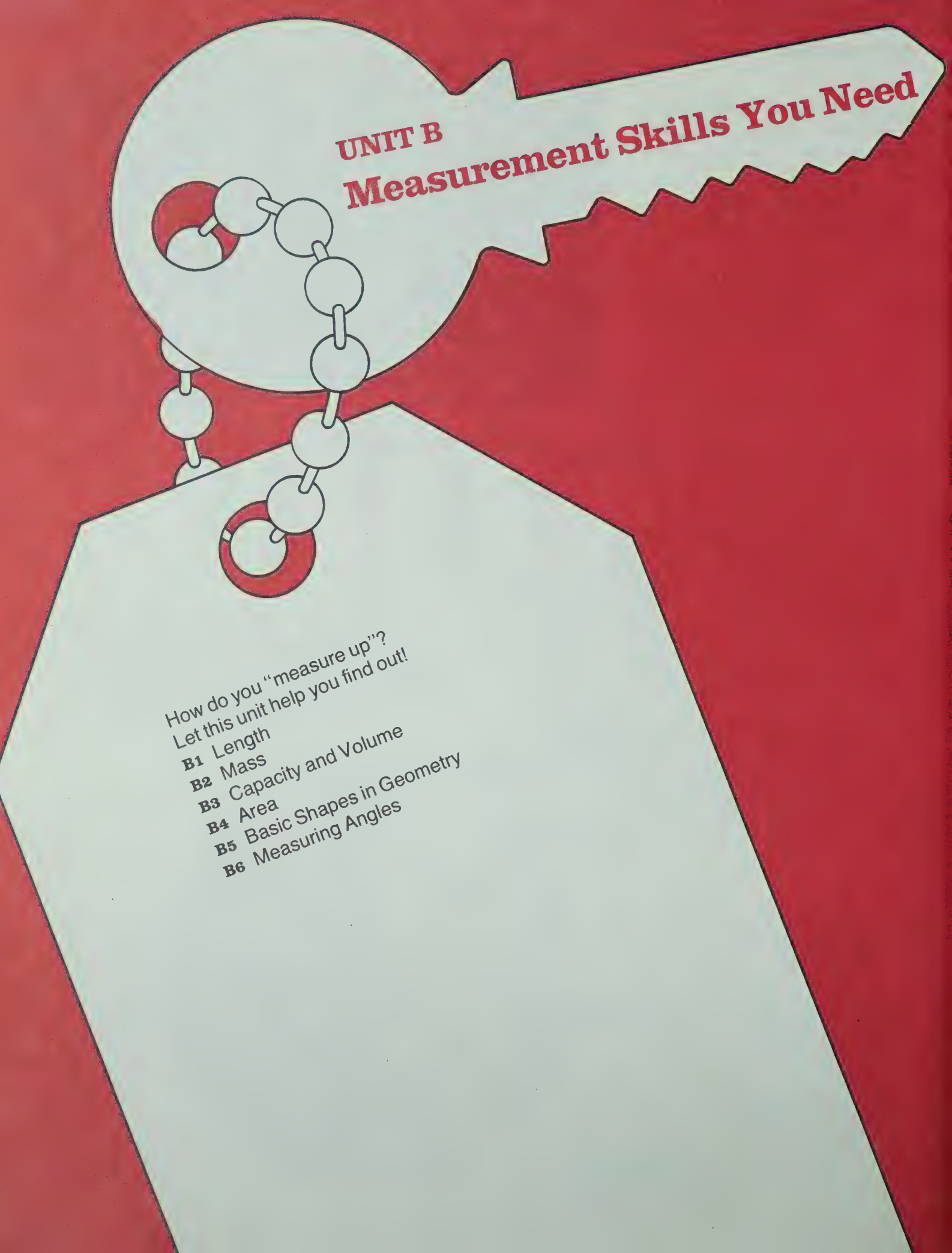
   How to Ride a Bicycle
   (a) Put your foot on the pedal.
   (b) Push off with the other foot.
   (c) Pedal with both feet.
   (d) Obey all road signs.
   (e) Swing your leg up over to the other side of the bicycle.

2. Rewrite these steps in the correct order.

   Making a Bank Deposit
   (a) Give the deposit slip and money to the teller.
   (b) Enter the bank.
   (c) Enter the line-up for the teller.
   (d) Make out a deposit slip.
   (e) Leave the bank after the teller makes your deposit.

3. Write the missing steps for this.

   Making a Pizza
   (a) Make up the dough.
   (b)
   (c) After the dough has risen, spread it out on a pan.
   (d) Put on the sauce.
   (e) Put on any other ingredients.
   (f)
   (g) Bake in the oven for 15-20 min.
   (h) Remove from the oven.
   (i) Cut into slices.
   (j)



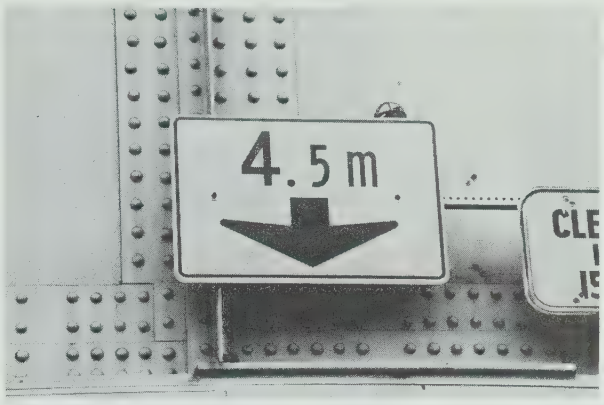
UNIT B
Measurement Skills You Need

How do you "measure up"?
Let this unit help you find out!

B1 Length
B2 Mass
B3 Capacity and Volume
B4 Area
B5 Basic Shapes in Geometry
B6 Measuring Angles

B 1 Length

Length is the measure of how long or how tall things are. The metre is the basic unit of length. There are larger and smaller units. They are related by multiples of 10.



1 km = 1000 m	1 hm = 100 m	1 dam = 10 m	1 m	10 dm = 1 m	100 cm = 1 m	1000 mm = 1 m
kilometre (km)	hectometre (hm)	decametre (dam)	metre (m)	decimetre (dm)	centimetre (cm)	millimetre (mm)

The common units are shown by the symbols km, m, cm, mm.

1. Choose the correct item to go with each measure of length.
   - (a) about 1 m: (i) a worm (ii) a fork (iii) a baseball bat.
   - (b) about 1 cm: (i) a staple (ii) a dollar bill (iii) a pen.
   - (c) about 1 mm: (i) an eraser (ii) a pencil tip (iii) a paper clip.
   - (d) about 8 m: (i) a basketball player (ii) a python (iii) a dog.
   - (e) about 40 cm: (i) a ping pong table (ii) a notebook (iii) a jacket.
   - (f) about 90 mm: (i) a pen (ii) a record jacket (iii) a stamp.
   - (g) about 1 km: (i) a flagpole (ii) an office building (iii) twice around a high school track.
   - (h) about 13 m: (i) a transport truck with trailer (ii) a rowboat (iii) a 747 jumbo jet.

2. Which unit would you use to measure each of these items?
   Use the following symbols: km, m, cm, mm.
   - (a) the length of your arm cm
   - (b) the height of a building ?
   - (c) the thickness of a $10 bill ?
   - (d) the width of your desk ?
   - (e) the depth of the ocean ?
   - (f) the distance from the earth to the sun ?
   - (g) the length of a Chevrolet Cavalier ?
   - (h) the thickness of a wall ?
   - (i) the distance between your eyes ?
   - (j) the length of a soccer field ?

3. For each line
   - estimate the length in centimetres
   - measure the length in centimetres.

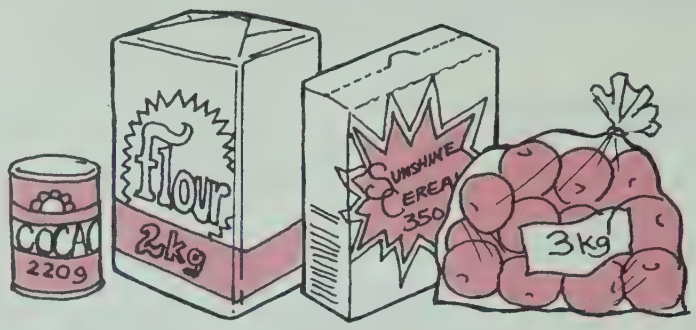
   (a) _____ (d) _____

   (b) _____ (e) _____

   (c) _____ (f) _____

B 2 Mass

Mass is the amount of substance that something has.
The gram is the basic unit of mass. There are larger and smaller units. They are related by multiples of 10.



1 kg = 1000 g	1 hg = 100 g	1 dag = 10 g	1 g	10 dg = 1 g	100 cg = 1 g	1000 mg = 1 g
kilogram (kg)	hectogram (hg)	decagram (dag)	gram (g)	decigram (dg)	centigram (cg)	milligram (mg)

The common units are kilogram and gram.
Greater masses are measured by the tonne. 1 t (tonne) = 1000 kg

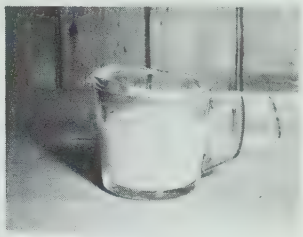
1. Choose the correct item to go with each measure of mass.
   (a) about 1 g: (i) a brick (ii) a penny (iii) a book
   (b) about 1 kg: (i) a dime (ii) a brick (iii) a pen
   (c) about 12 kg: (i) a Beagle (ii) a canary (iii) a cat
   (d) about 100 g: (i) two chocolate bars (ii) an ice cube (iii) a basketball
   (e) about 100 kg: (i) a radio (ii) a car (iii) a football player

2. Which unit would you use to measure the mass of each of these items? Use the symbols kg and g.
   (a) a pebble __g__
   (b) a car __?__
   (c) a drop of water __?__
   (d) a horse __?__
   (e) your boot __?__
   (f) a tree __?__
   (g) a tire __?__
   (h) a headache pill __?__
   (i) a silver dollar __?__
   (j) a roast of beef __?__

3. Read each of these statements. Indicate
   - "yes" if the estimate makes sense
   - "no" if the estimate doesn't make sense.

   (a) A budgie has a mass of about 4 kg.
   (b) A baseball has a mass of about 600 g.
   (c) An oil tanker ship has a mass of about 14 t.
   (d) A motorcycle has a mass of about 200 kg.
   (e) A hockey puck has a mass of about 10 g.
   (f) A ping pong ball has a mass of about 6 g.

B3 Capacity and Volume



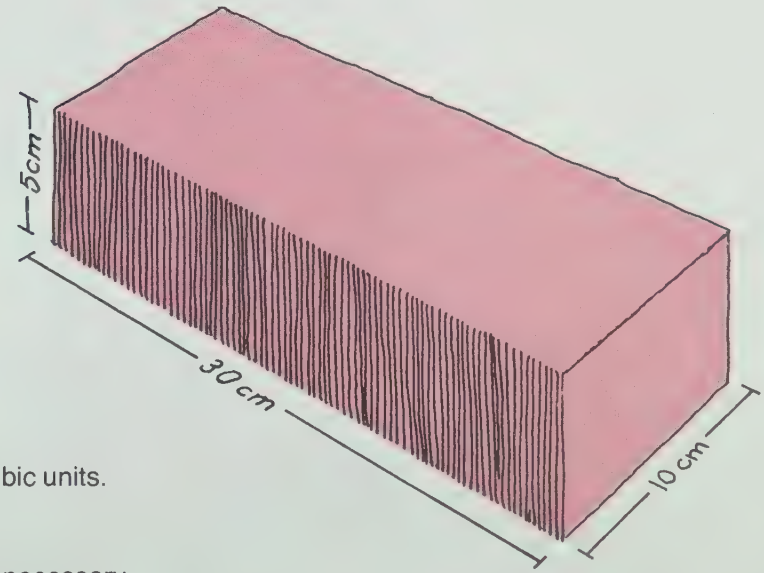
Capacity is the measure of how much a container can hold. The litre is the basic unit of capacity. There are larger and smaller units. They are related by multiples of 10.

1 kL = 1000 L	1 hL = 100 L	1 daL = 10 L	1 L	10 dL = 1 L	100 cL = 1 L	1000 mL = 1 L
kilolitre (kL)	hectolitre (hL)	decalitre (daL)	litre (L)	decilitre (dL)	centilitre (cL)	millilitre (mL)

The common units are shown by the symbols kL, L and mL.

1. Choose the correct item to go with each measure of capacity.
   - (a) about 1 L: (i) a fish tank (ii) a milk carton (iii) a glass of water
   - (b) about 1 mL: (i) five squirts from a ketchup bottle (ii) a raindrop (iii) a handful of water
   - (c) about 1 kL: (i) a full sink (ii) a full car gas tank (iii) a large pool, half-filled
   - (d) about 30 mL: (i) a capful of mouthwash (ii) a full soft drink can (iii) a half-full fish bowl
   - (e) about 10 L: (i) a full kitchen sink (ii) a small puddle (iii) a full bowl of punch

2. Read each of these statements. Indicate
   - "yes" if the statement makes sense
   - "no" if the statement doesn't make sense.
   - (a) An oil tanker truck has a capacity of about 15 000 kL.
   - (b) A thimble could hold 3 L of water.
   - (c) A soft drink can has a capacity of about 300 mL.
   - (d) A tube of toothpaste can have a capacity of 3.5 L.
   - (e) The human heart pumps about 18 L of blood throughout the body.



Volume is the amount of space a solid object takes up. Anything that has three dimensions (length, width, height) has volume. For example, a brick is 30 cm long, 10 cm wide and 5 cm high. What is its volume?

VOLUME = LENGTH × WIDTH × HEIGHT
= 30 cm × 10 cm × 5 cm
= 1500 cm^3 ← Volume is given in cubic units.
↖ cubic centimetre

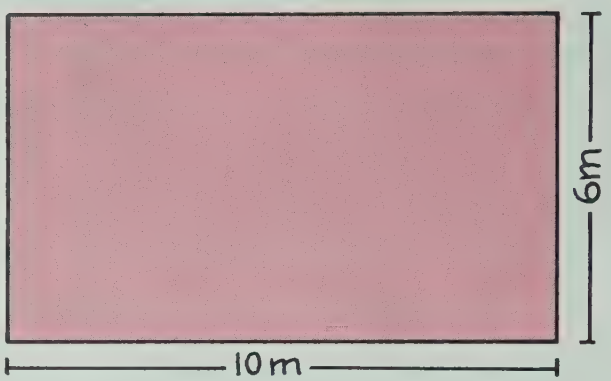
3. Calculate each volume. Draw diagrams if necessary.
   - (a) length = 6 m, width = 2 m, height = 4 m
   - (b) length = 10 m, width = 5 m, height = 3 m
   - (c) length = 7 m, width = 6 m, height = 80 cm
   - (d) length = 8 m, width = 4 m, height = 1 m

4. Which would you measure for each of these: volume or capacity?
   - (a) gasoline in a tank
   - (b) boxes on a shelf
   - (c) air in a balloon
   - (d) asphalt on a driveway
   - (e) a baseball
   - (f) space inside a speaker box

B 4 Area

Area is a surface, such as land, a table, or the outside of a can. It is measured in square units. Anything that has two dimensions (length, width) has area. For example, a floor is 10 m long and 6 m wide. What is the area of the floor?

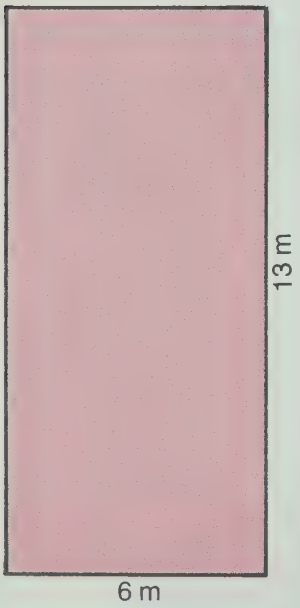
AREA = LENGTH × WIDTH
= 10 m × 6 m
= 60 m^2 ← Area is given in square units.
square metre



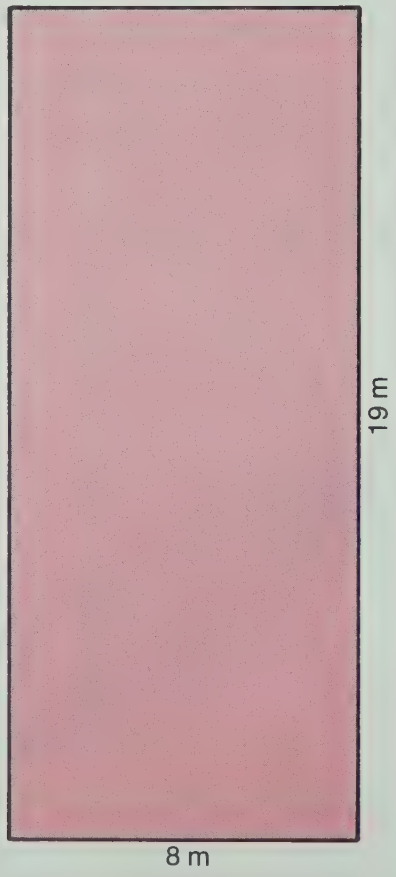
1. Calculate each area. Draw diagrams if necessary.
   (a) length = 12 m, width = 7 m
   (b) length = 66 cm, width = 12 cm
   (c) length = 8 mm, width = 2.9 mm
   (d) length = 38 m, width = 12.4 m

2. Calculate how much carpeting would be needed to cover each floor.

(a)



(b)



(c)

3. Choose the area that makes sense for each of these items.
   (a) a bathroom floor: (i) 200 m^2 (ii) 2 m^2 (iii) 686 cm^2
   (b) a gymnasium floor: (i) 2050 m^2 (ii) 225 m^2 (iii) 26 m^2
   (c) a medium-sized parking lot: (i) 28 000 m^2 (ii) 2078 000 m^2 (iii) 6500 m^2
   (d) a movie screen in a theatre: (i) 21 m^2 (ii) 210 m^2 (iii) 2100 m^2
   (e) a stamp: (i) 6 cm^2 (ii) 3 mm^2 (iii) 0.25 m^2

B5 Basic Shapes in Geometry

It's a good idea to know something about geometry. Geometry is the study of lines and shapes. It is used in many jobs, such as drafting. Can you think of others?

Here are some of the basic shapes and parts of geometry. Use them to help you to answer the questions below.

point

ray

line

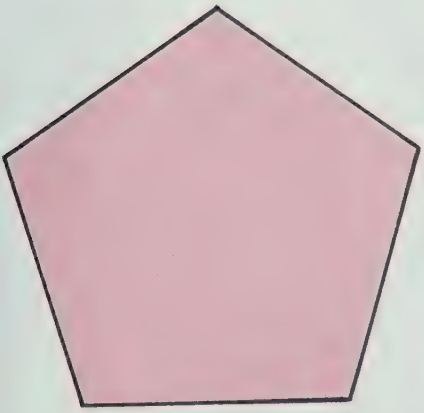
line segment

angle

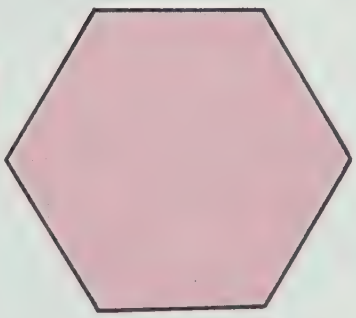
triangle

square

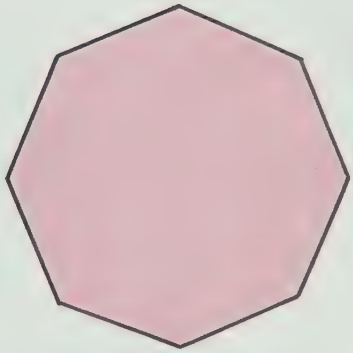
rectangle



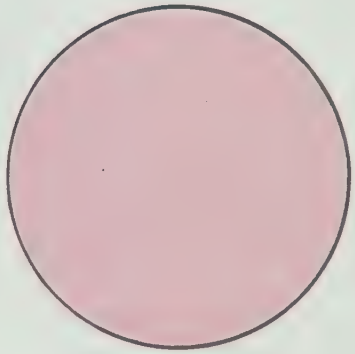
pentagon



hexagon



octagon



circle

1. Select the geometric shape or part that is similar to each of these .

   (a) a pencil point
   (b) baseball home plate
   (c) door
   (d) window
   (e) clock
   (f) highway going on and on
   (g) corner of a room
   (h) stop sign

2. Read each statement. Indicate
   - "yes" if the statement makes sense
   - "no" if the statement doesn't make sense.

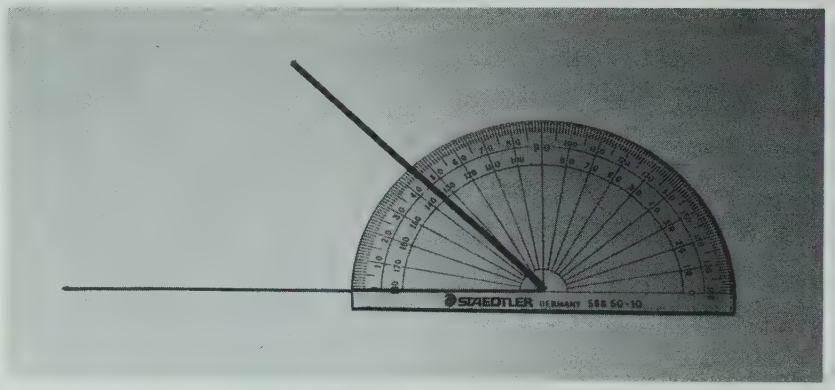
   (a) A square always has 4 equal sides.
   (b) A triangle always has 3 equal sides.
   (c) A line is made up of many points.
   (d) A ray is half a line.
   (e) A line segment has no end.
   (f) Pentagons can have 6 sides.

B6 Measuring Angles

*Protractor needed for this page.

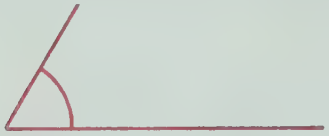
Angle measure is not that difficult — once you know the basics.
Angle measures are given in degrees. The symbol for degrees is °. There are 360° altogether. (A circle is 360°.)

Angles are measured with a protractor. For example, look at the angle and protractor at the right.
The protractor shows that the angle is 45°.



1. Use your protractor to find the measures of these angles.

(a)



(b)

(c)

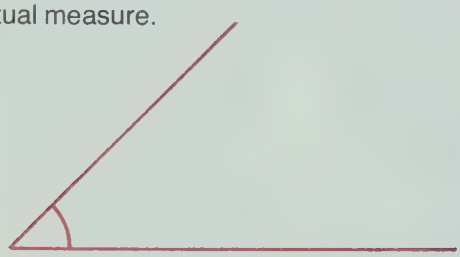
(d)

(e)

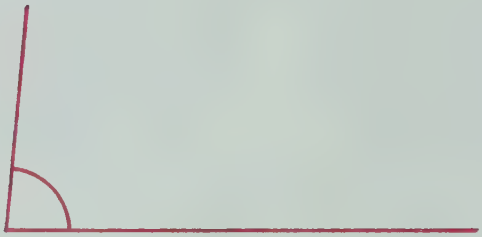
(f)

2. Estimate the measures of these angles. Then use your protractor to find the actual measure.

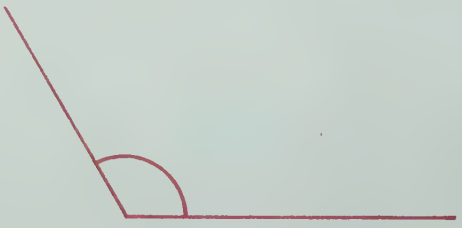
(a)



(b)



(c)

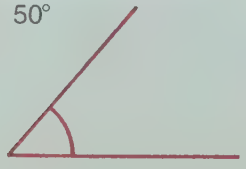


(d)

3. Look at each angle and its measure. Indicate
   - "yes" if you think the measure is correct
   - "no" if you think the measure is incorrect.

   Measure each angle to check.

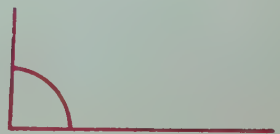
(a) 50°



(b) 140°

(c) 20°

(d) 89°



UNIT C
Computing Skills You Need

Have you ever heard the statement, "Practice makes perfect"? It doesn't always work out that way. But, "practice helps". The pages in this unit will help you practise basic skills in math.

C1 Whole Numbers and Decimal Fractions
C2 Decimal Fractions and Whole Numbers
C3 Decimal Fractions and Percents
C4 Decimal Fractions and Percents
C5 Decimal Fractions, Whole Numbers and Percents
C6 Decimal Fractions, Percents and Common Fractions
C7 Percents and Decimal Fractions
C8 Skills Break: Percents and Decimal Fractions
C9 Decimal Fractions and Tables

C1 Whole Numbers and Decimal Fractions

You are an employee of Tally-Up Opinion Polls Inc. Calculate the results of these opinion polls.

Poll 1: People who eat "Crackles Peanuts" by age group

Age Group	At Lunch	At Supper	In the Evening	At the Stadium	As a Snack
5-10	12	35	146	1879	12 612
11-18	16	7	285	943	8590
19-24	19	29	971	3914	13 716
25-35	23	87	1064	4886	45 628
36-60	4	16	286	5202	6891
TOTAL					

Poll 2: Hours spent watching television by age group

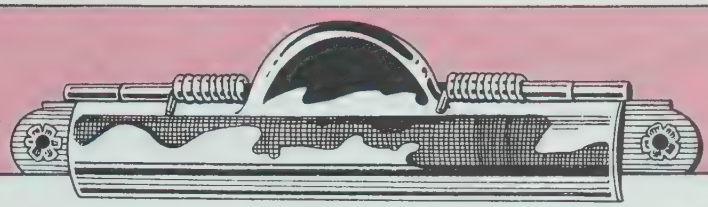
Age Group	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
2-5	0.3	0.22	0.18	0.03	0.47	0.66	2.16
6-11	0.2	0.04	0.95	0.30	0.36	0.8	3.71
12-17	0.3	0.08	0.65	0.81	0.9	0.32	0.86
18-24	0.9	0.57	0.80	0.25	0.81	0.10	0.90
25-55	0.5	0.22	1.09	0.10	0.12	0.12	1.74
56 and over	1.6	2.28	1.82	0.98	2.31	0.80	3.84
TOTAL							

Poll 3: Money earned on gas sales at selected stations

Station	Litres of Gas Sold in One Week	Cost/Litre	Money Earned on Gas Sales
Ed's Service	14 769	39.6¢	
Neway Station	37 861	40.2¢	
Pete's Station	103 914	41.8¢	
Sylvia's Service	76 418.8	40.5¢	
Hale Gas	1 674 912.3	40.6¢	
Bright's Spot	987 614.04	39.7¢	
Two-Guys	2 814 691.26	38.6¢	
TOTAL			

C2 Decimal Fractions and Whole Numbers

To get a job at Bleep! Robot Works, you must take an employment skills test. You have 25 min to prove you belong at Bleep!



BLEEP! ROBOT WORKS — EMPLOYMENT TEST

Answer all questions. — 25 min

1. Add.

(a)
$$\begin{array}{r} 648 \\ 29 \\ 17 \\ \underline{172} \end{array}$$

(b)
$$\begin{array}{r} 68.9 \\ 23.6 \\ 4.01 \\ \underline{9.3} \end{array}$$

(c)
$$\begin{array}{r} 0.192 \\ 0.86 \\ 1.97 \\ \underline{0.20} \end{array}$$

(d)
$$\begin{array}{r} 45.761 \\ 2.89 \\ 3.1 \\ \underline{7.084} \end{array}$$

(e) $6.4 + 2.9 + 3.14 + 0.8 =$

(f) $96.01 + 84 + 81.32 + 7 =$

2. Subtract.

(a)
$$\begin{array}{r} 37\,614 \\ \underline{-\ 23\,985} \end{array}$$

(b)
$$\begin{array}{r} 2.143 \\ \underline{-\ 1.092} \end{array}$$

(c)
$$\begin{array}{r} 65.171 \\ \underline{-\ 2.849} \end{array}$$

(d)
$$\begin{array}{r} 0.014\,6 \\ \underline{-\ 0.002\,97} \end{array}$$

(e) $6.871\,64 - 2.091\,76 =$

(f) $47.012 - 38.9176 =$

3. Multiply.

(a) $64 \times 11 =$

(b) $97 \times 13 =$

(c) $43 \times 2.1 =$

(d) $86 \times 3.04 =$

(e) $940 \times 1.001 =$

(f) $68.73 \times 23.7 =$

4. Divide.

(a) $64 \div 8 =$

(b) $96 \div 0.2 =$

(c) $325 \div 12.5 =$

(d) $94.07 \div 1.32 =$

(e) $6.819 \div 2.45 =$

(f) $2.916 \div 0.175 =$

C3 Decimal Fractions and Percents

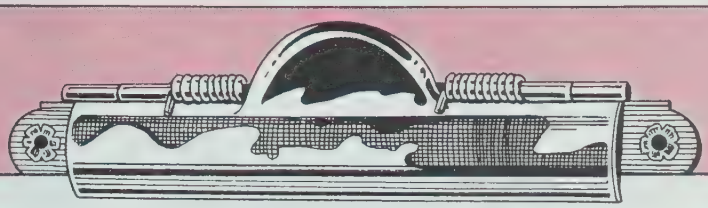
You are the editor of Wild or Wacky Facts. Change the common fractions and decimal fractions in the facts on this page to percents.

Wild or Wacky Facts
Facts to be included in this issue:

1. $\frac{97}{100}$ of all turtles are slower than tortoises.
2. $\frac{84}{100}$ of all people blink when dust enters their eyes.
3. 0.16 of all people rub their noses when dust enters their eyes.
4. $\frac{9}{10}$ of Fern Grobeck's plants are meat-eaters.
5. $\frac{36}{100}$ of Fern Grobeck's pets are missing.
6. 0.10 of all cars are in parking lots sometimes.
7. $\frac{3}{30}$ of all television sets are on during the night.
8. 0.084 of all dogs sleep under parked cars.
9. $\frac{9.7}{100}$ of all bricks used hold up the right corner of the Wecare Insurance Company building.
10. $\frac{2.3}{10}$ of all cats are lost.
11. $\frac{87.6}{100}$ of all trees in any forest are alive.
12. 0.6 of all canaries eat Birdstuff stuffing.
13. $\frac{23.4}{1000}$ of all Christmas presents are not wrapped.
14. $\frac{61.3}{100}$ of all bathtubs are full at any given time.
15. 0.05 of all pythons live in zoos.
16. $\frac{4}{20}$ of all cereals taste good.
17. $\frac{2}{200}$ of all baseball players use Green Hair Tonic.
18. $\frac{8}{16}$ of every direction is left.
19. $\frac{180}{200}$ of all issues of Wild or Wacky Facts are never sold.

C4 Decimal Fractions and Percents

Employees at Dive Loans must take a skills test every year. You have 20 min to keep your job at Dive.



DIVE LOANS

SKILLS TEST
20 min

1. Change to percents.

(a) $\frac{6}{100} =$ (d) $\frac{36}{100} =$ (g) $\frac{1}{2} =$

(b) $\frac{9}{100} =$ (e) $\frac{9}{10} =$ (h) $\frac{1}{4} =$

(c) $\frac{21}{100} =$ (f) $\frac{2}{10} =$ (i) $\frac{2}{5} =$

2. Change to percents.

(a) 0.13 = (d) 0.01 = (g) 0.002 =
(b) 0.28 = (e) 0.134 = (h) 0.1401 =
(c) 0.19 = (f) 0.892 = (i) 1.02 =

3. Change to decimal fractions.

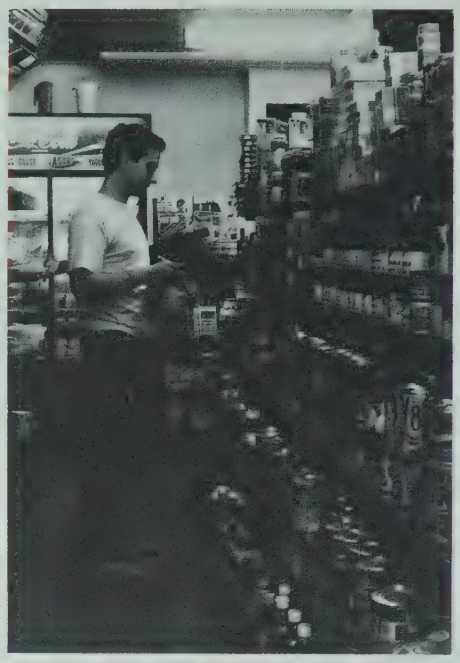
(a) 64% = (d) 2% = (g) 3.1% =
(b) 92% = (e) 19% = (h) 0.28% =
(c) 87% = (f) 12.4% = (i) 0.192% =

4. Change to decimal fractions, then to percents.

(a) $\frac{64}{100} = ? = ?\,\%$ (c) $\frac{3}{10} = ? = ?\,\%$ (e) $\frac{3}{4} = ? = ?\,\%$

(b) $\frac{9}{100} = ? = ?\,\%$ (d) $\frac{2}{4} = ? = ?\,\%$ (f) $\frac{1}{8} = ? = ?\,\%$

C5 Decimal Fractions, Whole Numbers and Percents



1. Your job at Melanie's is to keep a record of the stock. Complete the two stock record slips below.

Melanie's		FURNITURE DEPARTMENT	
Item	Stock at Beginning of Week	Stock at End of Week	Stock Sold
sofa	36	12	
chair	527	349	
recliner	128	113	
table	249	187	
end table	306	286	
coat rack	496	127	

Melanie's		ALBUM SALES: MONEY EARNED	
Album	Stock Sold	Price/Album	Total Money Earned
"I've Got You"	481	$6.98	
"You've Got Me"	397	$7.59	
"He's Got Us"	28	$6.59	
"We've Got Them"	656	$10.87	
"I Don't Sing"	27	$12.34	
"We Know"	971	$5.95	

2. Change the percents in these statements to decimal fractions.

   (a) 24% of all furniture sales were sofas.
   (b) 19% of all television sales were consoles.
   (c) 36.7% of all meals served were hamburger plates.
   (d) 6.13% of all employees took 12 d off.
   (e) 96.7% of all sales were cash.
   (f) 21.38% of all maintenance costs were paid for by customers.

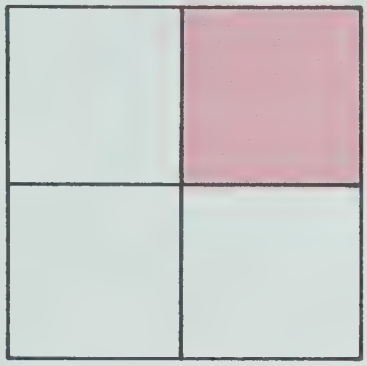
C6 Decimal Fractions, Percents and Common Fractions

1. For the shaded part of each shape,
   - write a common fraction
   - write a decimal fraction
   - write a percent.

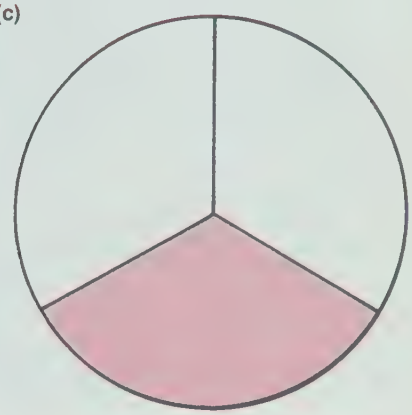
(a)

$\frac{4}{8} = 0.5 = 50\%$

(b)

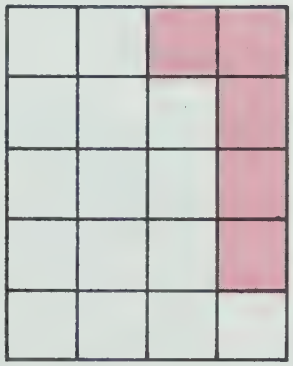


(c)

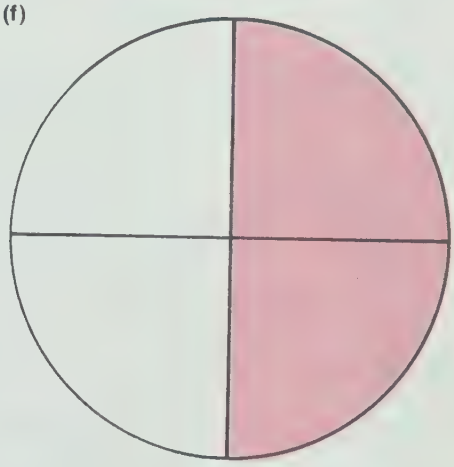


(d)

(e)



(f)



2. The common fractions below have been changed to decimal fractions, then to percents. Check for any errors. Put the corrections in your notebook.

(a) $\frac{3}{4} = 0.75 = 75\%$

(b) $\frac{4}{10} = 0.4 = 4\%$

(c) $\frac{3}{100} = 0.3 = 30\%$

(d) $\frac{1}{8} = 0.125 = 12.5\%$

(e) $\frac{4}{5} = 0.8 = 80\%$

(f) $\frac{9}{1000} = 0.009 = 90\%$

(g) $\frac{10}{200} = 0.5 = 5\%$

(h) $\frac{13}{14} = 0.929 = 92.09\%$

(i) $\frac{12}{144} = 0.083 = 8.3\%$

(j) $\frac{100}{1000} = 1.00 = 100\%$

3. Change the common fractions in these statements to decimal fractions, then to percents.

(a) $\frac{3}{6}$ of all answers are wrong.

(b) $\frac{1}{12}$ of all ants don't work.

(c) $\frac{8}{30}$ of all birthdays are forgotten.

(d) $\frac{2}{5}$ of all ice cream tastes good.

(e) $\frac{5}{25}$ of all cars need extensive repairs.

C7 Percents and Decimal Fractions

1. Employees at B.A. Tury Motors are paid by commission. Calculate the commission earnings for these salespersons.

	Salesperson	Total Sale For Month	Commission Rate	Commission Earned
(a)	Louise	$28 764	4%	$28 764 × 0.04 = ?
(b)	Derek	$19 837	3%	?
(c)	Marie	$29 406	3.5%	?
(d)	Deny	$34 917	3.7%	?
(e)	Sharon	$56 113	4.2%	?
(f)	Peter	$21 082.75	4.8%	?
(g)	Joe	$64 113.35	4.6%	?
(h)	Paul	$29 108.89	5.2%	?
(i)	Sheila	$208 614	5.1%	?
(j)	Arnold	$316 709.95	5.8%	?

2. The salespeople at B.A. Tury Motors are rated as to the percent of sales they have over the year. Copy this chart into your notebook. Change the percents to decimal fractions.

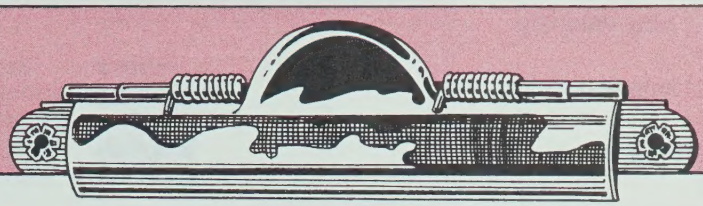
	Salesperson	Total Percent of Sales
(a)	Louise	4%
(b)	Derek	3%
(c)	Marie	11%
(d)	Deny	14.6%
(e)	Sharon	20.09%

	Salesperson	Total Percent of Sales
(f)	Peter	13.3%
(g)	Joe	8.1%
(h)	Paul	5.71%
(i)	Sheila	7.061%
(j)	Arnold	13.139%

3. (a) Calculate the total of all sales from question 1.
   (b) Calculate the total of all commission earned from question 1.
   (c) How much money did B.A. Tury Motors have left after the commission earnings were paid?

C8 Skills Break: Percents and Decimal Fractions

Try this skills test. Can you do it in 20 min?
Time yourself.



1. Find:
   - (a) 2% of 100 =
   - (b) 3% of 10 =
   - (c) 9% of 1000 =
   - (d) 21% of 6 =
   - (e) 19% of 84 =
   - (f) 37% of 75 =
   - (g) 12.5% of 8 =
   - (h) 19.1% of 67 =
   - (i) 0.12% of 29 =

2. Change these to percents.
   - (a) 0.12 =
   - (b) 0.84 =
   - (c) 0.19 =
   - (d) 0.135 =
   - (e) 1.82 =
   - (f) 2.476 =
   - (g) 0.018 =
   - (h) 0.009 =
   - (i) 0.0104 =

3. Change these to decimal fractions.
   - (a) 74% =
   - (b) 67% =
   - (c) 81% =
   - (d) 13.2% =
   - (e) 186% =
   - (f) 292% =
   - (g) 14.7% =
   - (h) 8.081% =
   - (i) 0.021% =

4. Multiply.
   - (a) $6.3 \times 2.4 =$
   - (b) $8.01 \times 1.2 =$
   - (c) $0.19 \times 1.87 =$
   - (d) $24.3 \times 0.16 =$
   - (e) $9.08 \times 0.04 =$
   - (f) $97.6 \times 1.089 =$
   - (g) $63.7 \times 24\% =$
   - (h) $8.31 \times 18\% =$
   - (i) $2.01 \times 16.7\% =$

C9 Decimal Fractions and Tables

This page will give you practice in reading information from tables.

1. These questions refer to the table at the right.
   (a) Which group spent the most time watching Canadian English stations?
   (b) Which group spent the least time watching Canadian English stations?
   (c) Which group spent the most time watching Canadian French stations?
   (d) Which group spent the least time watching Canadian French stations?
   (e) Who are the U.S. stations most popular with?
   (f) Which group watched the most television?

Average number of hours per week Canadians spent watching television, by language, sex and source of program, 1978

	Hours watching Canadian English stations	Hours watching Canadian French stations	Hours watching U.S. stations	Total hours
English:				
Male	14.8	0.1	6.1	21.0
Female	16.1	0.1	6.8	23.0
French:				
Male	2.9	19.3	1.1	23.3
Female	3.2	23.4	1.2	27.8
Other:				
Male	13.3	1.2	6.0	20.5
Female	14.9	1.0	7.0	22.9

Source: *Culture Statistics, Radio and Television*, Catalogue 87-630,1978. Courtesy of Statistics Canada

2. These questions refer to the table at the right.
   (a) Were cross-country skis popular in 1971?
   (b) Which item grew the most in popularity from 1971 to 1978?
   (c) Which items would increasing gasoline costs affect?
   (d) Which items dropped in popularity?
   (e) Why would items, such as canoes and sailboats, become more popular around 1978?
   (f) Which items do you think will be very popular in 1988? 1998? Give reasons for your answers.

Households owning selected recreational equipment, 1971 and 1978

	1971	1978
	per cent	
Downhill skis	—	14.2
Cross-country skis	—	16.9
Snowmobiles	7.3	9.7
Adult-sized bicycles	27.9[1]	42.0
Vacational homes	6.7	6.5
Tents	11.5	17.0
Tent trailers	3.8	4.2
Travel trailers	2.1	4.5
Truck campers	1.2	2.8
Canoes	2.1	5.0
Rowboats	3.1	3.4
Sail boats	0.9	1.3
Outboard motor boats	8.0	7.9

[1]figure is for 1972.

Source: Unpublished data, Education, Science and Culture Division, Statistics Canada
Courtesy of Statistics Canada

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